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RISK MANAGEMENT PLAN
DUTCH BOY SITE

Prepared for:

NL Industries, Inc.
Chicago, Illinois

Prepared by:

ENVIRON International Corporation
Arlington, Virginia

July 1998

CONTENTS

TABLES

FIGURES

I. EXECUTIVE SUMMARY

The Dutch Boy site (Site) is located in south-central Chicago, Illinois. Historically, the Site was used for lead-related operations that have resulted in lead contamination of surface and subsurface soils. Approximately 75% of the 5-acre Site is paved with reinforced concrete and is underlain by extensive utility infrastructure, for which no records exist.

The USEPA conducted a risk assessment for the Site and developed a cleanup goal of 1,400 mg/kg lead under an industrial future land use scenario. This Risk Management Plan presents and evaluates remedial scenarios to mitigate and manage the risks posed by lead contamination present in Site soils at concentrations above this threshold.

An investigation of the Site was conducted, during which thirty five boreholes were installed in the unpaved areas. Lead was detected in concentrations above the 1,400 mg/kg threshold in most of these boreholes. The depth of contamination exceeding the threshold was generally two feet or less, although in some boreholes contamination extended down to seven feet below ground. The total volume of soil exceeding the threshold is approximately 4,500 yd^3. Limited lead contamination was encountered under some of the paved sections of the Site. However, the existing pavement prevents access, adequately containing the lead. Thus, remedial options were considered to address exposed soils in the unpaved areas of the Site.

Technologies and remedial scenarios available to mitigate and manage the risks posed by this lead contamination include separation of the lead from the soil matrix, immobilization of the lead within the soil matrix, and containment of the soil and lead. These technologies were evaluated for protectiveness of human health and the environment and cost effectiveness. In addition, the appropriateness of the technology or remedial strategy for application at the Site was considered and used as a preliminary filter.

The most appropriate technologies were engineering/institutional controls through containment of the Site with a compacted soil cover and stabilization and solidification of the contaminated soil matrix, which immobilizes the lead. Disposal of treated soil off-Site at a RCRA Subtitle C landfill was also considered. Combinations of these technologies were all determined to be protective of human health and the environment and ranged in cost from approximately $750,000 to $1,600,000.

Alternatives considered included (1) a soil cover over the unpaved areas of the Site, (2) removal of the top two feet of soil in the principal threat waste area and a soil cover over the unpaved areas, (3) removal of the top two feet of soil in the unpaved areas, and (4) removal of all soil with lead concentrations greater than the 1,400 mg/kg threshold. Table ES-1 presents a summary of the alternatives evaluated.

The most cost effective protective remedy was determined to be removal and off-Site disposal of the top two feet of soil in the principal threat waste area in the vicinity of the loading dock, backfilling, and containment of the remaining unpaved area soil with a compacted, vegetated soil cover. This approach is consistent with provisions of the Administrative Order directing remediation of the Site. This strategy is protective of human health and the environment in that it removes soil with the highest concentrations of lead and prevents exposure to the remaining lead-impacted soil. Although not the lowest cost alternative, it is the most cost-effective in terms of removing principal threat wastes and maintaining the overall protectiveness of the remedy. This alternative is estimated to cost approximately $940,000

TABLE ES-1 Comparison of Remedial Alternatives			
Alternative	**Elements** [1]	**Protectiveness**	**Cost**
1. On-Site Containment	Five feet soil cover over the unpaved areas. Imposes restrictions on intrusive activities.	All exposed contaminated soils covered with several feet of soil, providing adequate protection of human health.	$740,000
2. Excavation of Principal Threat Waste, Containment	Excavate top two feet of soil in principal threat waste area, treat and dispose off-Site. Backfill and place five feet of soil cover over the unpaved areas.	As protective as Alternative 1. Removes the highly contaminated waste, thereby preventing exposure to this material should intrusive activity occur.	$940,000
3. Excavation of Two Feet of Contaminated Soil	Excavate two feet of soil, treat and dispose off-Site, backfill to original grade. Imposes restrictions on intrusive activities.	As protective as Alternative 1. Limits residual contamination to a smaller section of the site.	$1,200,000
4. Excavation of Contaminated Soil	Excavate all soils above the cleanup goal, treat and dispose off-Site, backfill to original grade.	As protective as Alternative 1, and provides for unrestricted Site use.	$1,600,000

[1] All alternatives include removal and disposal of the Debris Pile and the Underground Storage Tanks.

II. INTRODUCTION

A. Background

NL Industries, Inc. (NL) retained ENVIRON International Corporation (ENVIRON) to prepare this Risk Management Plan (Plan) to address the mitigation of risks to human health and the environment at the Dutch Boy Site (Site), Chicago, Illinois. This plan has been prepared in accordance with the March 26, 1996 Unilateral Administrative Order (Order) issued to NL by the U.S. Environmental Protection Agency (USEPA).

Pursuant to the requirements of the Order, ENVIRON prepared the *Final Revised Sampling and Analysis Plan, Dutch Boy Site, Chicago, Illinois*, (SAP) dated December 11, 1996 to guide the investigation of lead contamination in Site soil. Based on the results of this investigation, ENVIRON prepared the *Extent of Contamination Summary, Dutch Boy Site, Chicago, Illinois*, (EOC) dated November 19, 1997. The EOC is summarized in **Section III -- Extent of Contamination,** below.

This plan presents general remedial strategies to manage and mitigate the potential threat to human health and the environment posed by lead contamination in soil at the Site.

B. Site Description and History

The Site is located at 12042 South Peoria Street, Cook County, Chicago, Illinois (Figure 1). The Site consists of a parcel of land approximately 5.2 acres in size, and is surrounded by industrial facilities and warehouses to the north and south, and vacant or abandoned lots to the east and west. No buildings presently exist on-Site, although remnants of heavy machinery and processing equipment likely related to Site operations are present on the property. Approximately 75% of the Site is paved with concrete, 5% with asphalt, and the remaining land is not paved (Figure 2). The unpaved areas appear to be related to former railroad spurs that cross the property, and run in strips from north to south along the western edge of the property and extend to the southeast corner of the Site (Figure 2). Most of the Site is either at ground surface or elevated by approximately four feet to loading dock level. One large pile of debris, consisting of refuse from Site demolition operations, rests in the southwest corner of the Site. The debris pile comprises approximately 800 cubic yards of material. Several underground storage tanks are still present in the western portion of the Site, beneath concrete pads adjoining the northwestern Site boundary and within a loading dock between railroad spurs in the western part of the Site. Site soils comprise approximately two to four feet of artificial fill overlying the native olive green fine sands. A more detailed description of the Site and the surrounding properties is included in the SAP.

Historic land use at the Site has included the manufacture and refinement of white lead (i.e., lead carbonate) and lead oxide for lead-based paints and other lead-related products from 1906 until approximately 1980. According to Sanborn maps and historical aerial photographs, extensive building demolition occurred at the Site in the mid-1980s, with the final demolition of the Mill Building in 1996. Some structures were razed as early as the turn of the century.

Various other industrial activities have been conducted in the immediate vicinity of the Site, including an aluminum foundry, metal machining shops, vehicle and heavy equipment maintenance and storage, junkyards, coal yards, and other metal treatment, forging, finishing, and pickling operations. Sanborn maps, included in the SAP, show the specific locations of these operations. Although most of the properties surrounding the Site are currently abandoned or vacant, it is likely that historical activities at these facilities have influenced lead concentrations in soils in the Site vicinity.

III. EXTENT OF CONTAMINATION

The Extent of Contamination survey for the Dutch Boy Site was prepared in accordance with the March 26, 1996 Unilateral Administrative Order issued by the U.S. EPA to NL Industries, Inc. The primary objective of the EOC survey was to evaluate the vertical and horizontal extent of lead in soil at the Site and in its vicinity. The EOC survey was based on the *Final Revised Sampling and Analysis Plan, Dutch Boy Site, Chicago, Illinois* (ENVIRON December, 1996) (the SAP). In total, more than 350 environmental samples from 151 locations at the Site and its vicinity were collected and analyzed. The EOC report summarizes the results of this sampling and defines contamination likely attributable to historic activities at the Dutch Boy Site. The results of the on-Site soil sampling were compared with an industrial cleanup goal of 1,400 mg/kg lead in soils, established by the USEPA (1996a).

The extent of on-Site soils containing lead at concentrations greater than the 1,400 mg/kg industrial cleanup goal ("the cleanup goal") is generally limited to the western, unpaved portions of the Site. Figure 3 shows the extent of on-Site lead contamination exceeding the cleanup goal. The areas most affected are the former rail spurs leading to the loading dock in the northwestern portion of the Site. Surface soil (i.e., 0.0 - 0.2 feet below ground surface) lead concentrations in this area are in the 5,000-10,000 mg/kg range.

As evident from Figure 3, there are very few locations where soil lead concentrations exceed 1,400 mg/kg in the paved areas of the Site. Elevated areas (e.g., structures such as loading docks and building footprints elevated above ground surface) in the southern and eastern portions of the Site appear to contain clean fill and were not contaminated by Site operations. According to Sanborn Insurance maps from 1911, 1939, and 1973, much of the Site was paved or covered with buildings during most of the operational history of the Site (see Figure 2). Therefore significant lead contamination would not be expected to be present below the concrete. The sampling results summarized in Table 1 show only two locations (SS26 and SS28[1]) in the paved area where lead was present in concentrations substantially above 1,400 mg/kg in subsurface soils. Since contamination beneath the concrete is limited, is not susceptible to migration, and is not accessible, the remainder of this report addresses only lead contamination in the unpaved areas, where lead is accessible so that exposures to lead may occur.

[1]The concrete at SS-26 was approximately one foot thick. The fill material sampled at SS-28 appeared to be sandwiched between two layers of concrete.

Besides lead, analyses for several other parameters (e.g., asbestos, petroleum hydrocarbons, and volatile organic compounds) were conducted on selected samples to evaluate their impact on remedial technologies for the lead-contaminated soil. The investigation results show the presence of diesel-related petroleum hydrocarbons near the loading dock in the northwest portion of the Site (Figure 2). This contamination is confined to soils in the immediate vicinity of the USTs. Based on the level of hydrocarbon contamination detected at the Site, it is unlikely that hydrocarbon contamination will affect any of the technologies that may be used to address lead contamination. Nevertheless, this observation will have to be confirmed once a remedy for the Site is selected.

IV. SITE REMEDIATION CONSIDERATIONS

The USEPA (1996a) calculated a cleanup goal of 1,400 mg/kg for lead in soil taking into consideration future industrial/commercial use of the Site. Precluding contact with soil containing lead above these concentrations protects human health and the environment, under exposure scenarios and working conditions typical of industrial facilities. Accordingly, this Plan focuses on soils that exceed the cleanup goal of 1,400 mg/kg and evaluates remedial alternatives that minimize potential exposure to this material.

A. Volume of Contaminated Soil

The volume of contaminated soil is estimated based on the spatial distribution of soil borings in which lead was detected above 1,400 mg/kg. Lead was detected above the 1,400 mg/kg threshold in most borings in the unpaved areas of the Site (Figure 3). To estimate the area of lead impacts represented by the boreholes, an irregular polygon was constructed around each borehole such that the sides of the polygon are an equal distance away from the borehole and its nearest neighboring boreholes. This procedure (called the method of Thiessen's polygons) assumes that each borehole is equally significant in the sampling strategy. The areas of each of these borehole-centered polygons are presented in Table 2. The depth of contamination provides the final dimension needed for calculating the volume of soil impacted by lead at concentrations greater than 1,400 mg/kg. This volume then represents a column of soil at the Site whose areal footprint is defined by the Thiessen polygon and whose depth is defined by the greatest depth at which lead was detected at concentrations greater than 1,400 mg/kg.

Table 2 presents the total volume of soil with lead concentrations greater than 1,400 mg/kg around each borehole. The volume of affected soils in the 0-2 feet interval is approximately 3,000 cubic yards. An additional 1,500 cubic yards of contaminated soil is present in the subsurface soil in the loading dock area, resulting in a combined estimated volume of approximately 4,500 cubic yards. As shown in Table 2, the lead concentrations in soils within the 0-2 feet interval is generally above 2,000 mg/kg.

B. Principal Threat Wastes

The USEPA has established general expectations in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for dealing with the threat posed by hazardous substances at a Site. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. In defining a level of lead in soil that would meet the definition of principal threat wastes, USEPA has selected a concentration of 40,000 ppm, assuming exposure can occur to such material. USEPA has expressed a preference for treatment, wherever practicable, to address principal threat wastes.

Based on the levels of lead at the Site, it is anticipated that approximately 1,000 cubic yards of soil may be characterized as principal threat wastes. USEPA requires that treatment of principal threat wastes be considered, but does not necessarily require that treatment be conducted, depending on site-specific considerations.

C. Remedial Strategies

The fundamental goal of any remedial strategy for the Dutch Boy Site is to mitigate the risk to human health and the environment presented by lead-contaminated soil. The USEPA (1996a) has established a threshold of 1,400 mg/kg lead for defining the lead contamination to be addressed. Section IV.A defined the nature and extent of soils exceeding this threshold. Risk from soils with concentrations of lead greater than this threshold can be mitigated by interrupting the pathway between the source of the risk and any populations at risk or by removing the source of the risk -- the soil. Pathways can be interrupted by physically or chemically immobilizing the lead in the soil matrix or by introducing a physical barrier to the soils, such as a cap or cover. Source removal at this Site would require either excavation of the contaminated soil and disposal in an appropriate facility, or excavation, treatment of soil to remove/immobilize the lead, and replacement of the treated soil on-Site. Given the lead concentrations in soil, some form of treatment would be required prior to off-Site disposal (PDC 1998; Heritage 1998).

Consistent with USEPA's guidance on principal threat and low level threat wastes, a combination of treatment of principal threat wastes, and engineering controls (such as containment) and/or institutional controls for remaining wastes, is the remedial strategy that is most applicable given conditions at the Dutch Boy Site. Other issues and problems with which a remedial strategy should be consistent are the final disposition of underground storage tanks (USTs) and the Debris Pile (Figure 3).

opinic -too end

Remedy evaluation in this report will qualitatively acknowledge the degree to which usable infrastructure, such as paved areas and loading docks, is preserved for future developers. Restrictions on future development and land use that might result from a particular type of remedial risk management strategy will also be considered, as appropriate.

cover erosion and degradation. Cover systems also require periodic monitoring and maintenance to ensure the protectiveness and durability of the remedy.

It should be noted that much of the Site is already covered, by the existing concrete pavement and structures. Under these circumstances, a concrete or asphalt cap is a reasonable containment option. However, given the differences in grade between the paved and unpaved areas, a cover constituting several feet of soil is adequately protective and more economical than concrete or asphalt caps. Thus, a soil cover was selected as the containment technology for further evaluation.

B. Immobilization Technologies

Immobilization technologies are the most commonly used form of treatment prior to disposal. The most common method of immobilization is stabilization/solidification (S/S), which physically binds the soil matrix together more firmly. This can be done *ex situ* or *in situ* and is accomplished by mixing the lead-contaminated soil with a binding reagent to hold together more firmly the soil matrix and the lead compounds or particles. The S/S technique has been used widely at many lead-contaminated Sites, with a variety of binding agents and is the preferred technology for treatment prior to off-Site disposal (PDC 1998; Heritage 1998). With *ex situ* S/S, soil is excavated and mixed with the reagent in a pug mill, then replaced in the subsurface or disposed in a secure chemical landfill. *In situ* S/S relies on injecting the binding agent directly into the subsurface using jets, augers, backhoes, draglines, or other soil mixing equipment. The primary challenge with *in situ* S/S is achieving an acceptable degree of mixing between the contaminated soil and reagent in the subsurface and verifying the stability of the resultant mixture. *Ex situ* S/S produces much better mixing and long term stability.

Subsurface access at the Site is heavily obstructed and most of the Site is covered with reinforced concrete; below the concrete are numerous utility lines from public services and from Site operations. No records of the locations for many of these structures exist. Several borings had to be moved during the EOC sampling; subsurface access by the narrow-diameter, smooth-bore direct-push probe was refused. This, large-scale tilling or *in situ* mixing equipment is much less likely to reach the subsurface of the Site. In general, *in situ* S/S has many more uncertainties with respect to the complete mixing and immobilization of contaminants. Consequently, *ex situ* S/S is preferred over *in situ* S/S as an immobilization technology for this Site.

The addition of binding agents to the soil, whether treated *ex situ* or *in situ*, will result in a larger volume of material than that which was excavated initially. Volume expansion can range from 10% to 50% depending on the reagent used for stabilization. This must be accounted for during cost estimating. Typical costs for S/S are on the order of $100 per ton of soil treated (USEPA 1994a, 1994b, 1997; PDC 1998; Heritage 1998).

Any hydrocarbon contamination co-located in the lead-contaminated soil would be immobilized with the same reagents. Since the levels of hydrocarbons are not very high, additional treatment beyond S/S would not be required. The reagents used for S/S are unlikely to present potentially adverse chemical reactions with the hydrocarbons.

Another method for immobilizing lead on soil is vitrification. As with S/S, this can be done *ex situ* or *in situ*. Vitrification uses energy (electrical or heat) to melt and convert the soil matrix and contaminants to a glass-like solid substance. Once converted to a glass-like solid, the soil and contaminants are typically very stable and exhibit very low levels of contaminant leaching. The stability of the vitrified soil depends on the chemistry of the soil; additional compounds may be required to ensure the desired stability after the melting process. Another advantage of vitrification is that any organic compounds present in the contaminated soil would be destroyed through pyrolysis. Vitrification, though, is a very energy-intensive and therefore expensive process. Because of this, vitrification has been used primarily for solidifying radioactive wastes. Typical vitrification costs range from $400 to $870 per cubic yard and higher (USEPA 1994a, 1994b, 1997).

Both S/S and vitrification can convert soil and lead contamination to a highly immobile, stable form. Vitrification produces a more stable end product than S/S, but is considerably more expensive. Since lead is generally nonreactive and insoluble, the incremental increase in effectiveness at immobilizing lead offered by vitrification is not worth the additional costs. S/S is equally acceptable at immobilizing lead and is sufficiently protective of human health and the environment. Therefore, only the lower cost S/S will be addressed in evaluating remedial scenarios.

C. Separation Technologies

Another general treatment strategy for lead-contaminated soil is the removal or separation of lead from the soil matrix, leaving clean soil. This can be done *in situ* or *ex situ*. *Ex situ* methods involve excavation of soil and washing the soil with water or reagents. Water washing generally physically separates the fine fraction of soils, which usually contains most of the lead. Two waste streams result: (1) a concentrated lead-contaminated aqueous liquid or slurry with a high percent solids, and (2) relatively clean soil. The clean soil may be placed back at the Site, but the water-based effluent from the washing process requires appropriate disposal. The unit cost for disposing of lead-contaminated liquids is often higher than disposal for the original contaminated soil, although this may be offset by the smaller volume.

Chemical solvents can also be used to isolate and solubilize just the lead with selective leaching, removing it from the soil matrix. This results in a liquid chemical waste enriched in lead that requires special disposal and clean soil. Soil washing/separation has been done at many Sites with lead-contaminated soil, including the Ewan Property, N.J.; Zanesville Well Field, OH; and the Twin Cities Army Ammunition Plant, MN. Soil washing costs range from $60 to $245 per cubic yard. This does not include disposal of the contaminated effluent, which generally costs approximately $300 per 55-gallon drum (USEPA 1994, 1994b, 1997). The amount of waste effluent generated will depend on the washing process, determined in pilot tests, and the reagents used. Because of the high costs of disposing liquid waste effluent, soil washing processes are not considered further.

In situ methods use liquid-based flushing of the contaminant from the soil with capture of the contaminant-enriched flushing agent. Soil flushing of lead-contaminated soil has reportedly only been done once, at the Lipari Landfill, N.J. The Lipari flushing system required extraction wells below the zone of contamination. Because *in situ* flushing has not been widely used for inorganics, it is not appropriate for the Dutch Boy Site.

Another *in situ* flushing technology is electrokinetics. Electrokinetics provides *in situ* selective removal of lead and other ionic compounds from saturated soils. Electrokinetics uses electrodes installed in the soil to induce an electrical field in the subsurface. A low pH acid front is generated in the pore water at the negatively charged electrode. This acid front migrates across the subsurface to the opposite, positively charged electrode. Metallic and other compounds are dissolved into the low pH water. Dissolved ions then migrate through the water, under the electric potential gradient to the electrode that carries the opposite charge of the ion. Lead is generally present in soils as positively charged (cationic) oxide compounds, so it would migrate to the negatively charged electrode. Once the lead has been flushed from the soil, the electric current is shut off, the subsurface conditions return to normal, and the metals precipitate out in a much smaller volume of contaminated soil, which can then be excavated. Refinements on this technology include use of electrodes installed into wells; the contaminants migrate into the wells and can be pumped out.

Since the migration of the contaminants occurs in the dissolved phase, electrokinetics is really only applicable in well-saturated soils. Dry soils may require additional water to be added to the system. Given the extensive impermeable pavement at this Site, soil saturation would be difficult to achieve. Electrokinetics has been used on lead-contaminated soils, primarily in pilot-test scenarios. Although electrokinetics has been more widely used in Europe, it is not yet commonly used in the U.S. Because of the lack of maturation and use in the U.S. and the requirement for well-saturated soils, electrokinetics is not appropriate for use at the Dutch Boy Site.

D. Summary

Several proven technologies exist to mitigate and manage the risks posed by soil at the Dutch Boy Site, including containment, immobilization, and separation. Technologies such as soil washing, chemical extraction, electrokinetics, and vitrification are all technologically immature, generate large secondary waste streams, and/or are not cost effective. Therefore, the most feasible technologies for the Dutch Boy Site are containment using a soil cover and *ex situ* stabilization/solidification. These technologies are well proven, appropriate for Site conditions, and are protective of human health and the environment.

VI. DESCRIPTION OF REMEDIAL SCENARIOS

The remedial scenarios available for the Dutch Boy Site include various combinations of excavation, treatment, disposal, and containment. Unit cost and technology performance data are taken from a variety of sources including vendor quotes, R.S. Means Co., 1998, *Environmental Remediation Cost Data - Assemblies*; USEPA 1994a, *Remediation Technology Screening Matrix*; USEPA 1994b, *Innovative Site Remediation Technology: Solidification/Stabilization, Volume 4*; and USEPA 1997, *Engineering Bulletin: Technology Alternatives for the Remediation of Soils Contaminated with As, Cd, Cr, Hg, and Pb*.

A. Miscellaneous Materials

1. Debris Pile

The Debris Pile on Site presents physical hazards in addition to risks from the asbestos-containing material (ACM) discovered in the EOC survey. The most feasible remedy for the Debris Pile is removal and disposal at an appropriate off-Site landfill. Given the relatively low levels of asbestos, disposal in a Subtitle D landfill would be feasible. At a unit cost of approximately $20 per cubic yard, removal and disposal of the Debris Pile is estimated to cost approximately $16,000.

2. Underground Storage Tanks

There are nine USTs at the Site, with a total capacity of approximately 150,000 gallons. These USTs are no longer in service, and their original contents appear to have been removed. In general, two options exist for closure of these tanks: complete removal of the tanks or abandonment in place (AIP). There are no compelling reasons for leaving the USTs in place, and the costs associated with AIP are comparable to removal of the tanks. Based on the estimated capacity of 150,000 gallons and a removal cost of $1.25 per gallon, the total cost for cleaning, excavating, and disposing of the tanks, plus backfilling the excavation zones, is estimated to be approximately $187,500.

B. Lead-Impacted Soil

Based on the technologies evaluated in the preceding chapter, four alternatives were considered that meet the objective of the Administrative Order of being adequately protective of human health and the environment. These alternatives are as follows:

1. Containment of all ~~soil~~ with lead concentrations greater than 1,400 mg/kg;
2. Removal of ~~principal~~ threat wastes and containment of all soil with lead concentrations greater than 1,400 mg/kg;
3. Removal of the top two feet of soil in the unpaved areas and principal threat wastes, followed by containment of all remaining soil with lead concentrations greater than 1,400 mg/kg; and
4. Removal of all soil with lead concentrations greater than 1,400 mg/kg.

These are discussed in detail below.

1. Alternative 1 - On-Site Containment

Alternative 1 would entail placing compacted fill over the unpaved areas to an average final depth of approximately five feet. This would raise the unpaved areas to a level approximately two feet above the existing paved areas, which would provide effective drainage and erosion control.

Fill will require periodic maintenance, revegetation, and verification sampling to ensure that contaminated soil is not exposed at the surface. Placing and compacting clean fill, at approximately $20 per cubic yard, would cost about $216,000 for the approximately 4,621 square yards comprising the unpaved areas of the Site. Annual operations and maintenance costs are likely to be on the order of $5,000 to $10,000 per year. Assuming a 5% discount rate and $7,500 per year average maintenance costs, the present worth operations and maintenance cost over 30 years would be $115,000.

The USTs and Debris Pile would be closed as described in Section A above, for a cost of approximately $203,000.

The Site-wide total cost for covering the lead-impacted soil, and Debris Pile and UST removal, plus design, management, and contingency would be $744,000. Table 3 summarizes the major cost components.

2. Excavation, Treatment, and Off-Site Disposal of Top two feet of Principal Threat Soil and Containment of Remaining Unpaved Area Soils

Alternative 2 comprises removal of the top two feet of lead-contaminated soils in the unpaved area in the locations where principal threat wastes are found (in the vicinity of boreholes SS06 through SS12) followed by backfilling and covering the entire unpaved area as described in Alternative 1 above. The principal threat waste area comprises an area of approximately 963 square yards. This yields a total volume of 640 cubic yards for transportation to the Peoria Disposal Company's RCRA Subtitle C facility, treatment with S/S, and secure landfill disposal.

The remainder of the soil in the unpaved area exceeding the 1,400 mg/kg threshold would be contained by a soil cover, as described above. The USTs and Debris Pile would be addressed as described in Section A above, for a cost of approximately $203,000.

The Site-wide total cost for covering the lead-impacted soil, and Debris Pile and UST removal, including design, management, and contingency is estimated to be $940,000. Table 4 summarizes the major cost components.

3. Alternative 3 - Excavation, Treatment, and Removal of the Top Two Feet of Contaminated Soil in the Unpaved Areas

This alternative considers the excavation, treatment, and disposal of the soil in the top two feet of the unpaved areas, nearly all of which exceed the 1,400 mg/kg threshold. This soil horizon is where the majority of the lead in the unpaved areas is located. Excavated soil would be transported to the PDC facility, treated with S/S, and disposed in the PDC RCRA Subtitle C landfill. Excavation, treatment and disposal costs are estimated to be $656,000. The USTs and Debris Pile would be addressed as described in Section A above, for a cost of approximately $203,000.

The Site-wide total cost for this alternative would be $1,197,000, including design, management, and contingency. Table 5 summarizes the major cost components.

4. Alternative 4 - Excavate All Unpaved Area Soils With Greater Than 1,400 mg/kg Lead, Treat Off-Site, Dispose Off-Site

This alternative considers excavation, treatment, and disposal of all the soil in the unpaved areas with lead contamination greater than 1,400 mg/kg. Excavated soil from the unpaved areas would be transported to the PDC facility treated with S/S, and disposed in the PDC Subtitle C landfill. Excavated soil would be replaced with compacted clean fill to original grade. The cost for removal, treatment, and disposal of the lead-impacted soil would be $967,000.

The USTs and Debris Pile would be addressed as described in Section A above, for a cost of approximately $203,000.

The Site-wide total cost for this alternative, including design, management, and contingencies, is estimated to be $1,630,000. Table 6 summarizes the major cost components.

VII. EVALUATION OF REMEDIAL SCENARIOS

A. Comparison of Alternatives

The best remedial alternative is that which protects human health and the environment over the long term. The evaluation of alternatives is weighted primarily on protectiveness and cost, in accordance with the Order. All the alternatives that passed through the screening process are protective of human health and the environment, therefore differentiation between alternatives is based primarily on cost.

Alternative 1 requires that all soil containing lead be covered with several feet of compacted, vegetated soil. This alternative includes provisions for the continued maintenance of this cover as well as periodic sampling and analysis to ensure that the protectiveness is adequate. This alternative is protective in that exposure to the contaminated soil is interrupted. This is consistent with the Administrative Order (USEPA 1996), which states in Section V.3.d, "...soils left exposed must not pose a threat..." Since the lead-contaminated soils are not exposed at the surface, but are covered with several feet of clean soil, no exposure is permitted. However, isolated hot spots of high concentrations of lead, above the principal threat criterion, remain, which will require that restrictions be placed on intrusive activities in the hot spot areas. The Debris Pile and USTs are removed under this and all other alternatives.

Alternative 2 is similar to Alternative 1, but removes soil with high concentrations of lead. This approach is consistent with the recommendation in Section III.16 of the Administrative Order, which recommended that "...any hot spots which are significantly higher than the 1,400 ppm be remediated even if, when averaged, they contribute to an acceptable range of risk." This mitigates any potential future exposures and risks associated with the principal threat wastes, which are treated with S/S and disposed in an appropriate RCRA Subtitle C secure landfill. This alternative also includes provisions for the continued maintenance of the soil cover as well as periodic sampling and analysis to ensure that the protectiveness is adequate. This alternative is protective in that exposure to the contaminated soil is interrupted. This is consistent with the Administrative Order (USEPA 1996), which states in Section V.3.d, "...soils left exposed must not pose a threat..." Since the lead-contaminated soils are not exposed at the surface, but are covered with several feet of clean soil, no exposure is permitted. Since principal threat wastes are removed, Alternative 2 affords an added level of protection in the long-term, although short term implementation risks will have to be controlled.

Alternative 3 removes the top two feet of soil in the unpaved area that contains soil with lead concentrations greater than the 1,400 mg/kg threshold established in the USEPA risk assessment. All excavated soil is removed from the Site, treated, and disposed in a RCRA Subtitle C secure landfill. The excavation zone is backfilled with compacted, clean soil. This clean fill acts as a cover for soil below the two foot horizon that contains lead at concentrations above the 1,400 mg/kg threshold. Removal of the top two feet of soil will address exposed soil across the Site, leaving residual lead at depths that are not readily accessible. The cost of this alternative is approximately 30% greater than that of Alternative 2.

Alternative 4 entails complete removal of all lead-contaminated soil in the unpaved area with concentrations greater than 1,400 mg/kg. This strategy removes all long-term risk under an industrial reuse scenario and minimizes future operations and maintenance burdens. This alternative also costs the most, is the most logistically challenging given Site conditions and uncertainty about subsurface conditions, and has the highest implementation risks. Thus, the increased costs for this alternative are not justified.

B. Recommended Alternative

The recommended alternative for this Site is Alternative 2. This alternative incorporates the excavation of principal threat wastes at the Site and provides for a compacted soil cover over soil contaminated with lead at concentrations greater than 1,400 mg/kg. The excavated soil would be treated with solidification/stabilization using binding agents appropriate to the soil chemistry and disposed in a RCRA Subtitle C landfill. The soil cover and concrete pavement effectively interrupts any potential inhalation and ingestion exposure pathways for any remaining lead-contaminated soil, protecting human health and the environment, which satisfies the requirements of the Order stated in Section V.3.d, "...soils left exposed must not pose a threat..." Since the lead-contaminated soils are not exposed at the surface, but are cov~~ered with several~~ feet of clean soil, no exposure is ~~permitted~~ and protectiveness is maintained. Also as part of this alternative, the USTs would be removed and closed and the Debris Pile would be removed from the Site and disposed in a Subtitle D landfill.

In conclusion, this remedy is adequately protective of public health and the environment, meets the statutory criteria established under the NCP, is consistent with the Administrative Order, and is a cost effective remedy.

VIII. REFERENCES

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TABLES

TABLE 1
Summary of On-Site Lead Results
Dutch Boy Site: Chicago, Illinois

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS01	2.7	0.0 - 0.2	330.
		0.2 - 1	950.
		1 - 2	1,970.
		2 - 3	131.
		3 - 4	4.5
		4 - 5	14.6
		5 - 6	9.2
		6 - 7	8.5
		7 - 8	5.5
SS02	2.0	0.0 - 0.2	2,300.
		0.2 - 1	1,130.
		1 - 2	3,200/< 5,000
		2 - 3	6.7
		3 - 4	11.3
		4 - 5	13.7/20.4
		5 - 6	5.4
		6 - 7	32.
SS03	3.5	0.0 - 0.2	1,310.
		0.2 - 1	850.
		1 - 2	3,900.
		2 - 3	9.9
		3 - 4	12.5
		4 - 5	6.
		5 - 6	11.
		6 - 7	8.5
		7 - 8	8.8
		8 - 9	12.4
SS04	3.5	0.0 - 0.2	3,500.
		0.2 - 1	3,500.
		2 - 3	780.
		3 - 4	18.6
		4 - 5	7.5
		5 - 6	9.1
SS05	4.0	0.0 - 0.2	193.
		0.2 - 1	86.
		1 - 2	2,610.
		2 - 3	580.
		3 - 4	13.5
		4 - 5	13.8
		5 - 6	7.5
		6 - 7	186.
		7 - 8	17.7
		8 - 9	110.

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS06	4.0	0.0 - 0.2	4,000.
		0.2 - 1	16,300.
		1 - 2	460.
		2 - 3	53,100.
		3 - 4	1,580/1,370
		4 - 5	46.
		5 - 6	8.
		6 - 7	15.2
		7 - 8	8.1/7.6
		8 - 9	8.5
SS07	3.6	0.0 - 0.2	1,730.
		0.2 - 1	3,500.
		1 - 2	17,600.
		2 - 3	10,000.
		3 - 4	7.2
		4 - 5	17.5
		5 - 6	5.6
		6 - 7	11.7/9.9
		7 - 8	9.2
SS08	3.8	0.0 - 0.2	5,800/6,300
		0.2 - 1	30,300.
		1 - 2	60,000.
		2 - 3	238.
		3 - 4	9,100.
		4 - 5	49.
		5 - 6	8.6/29.1
		6 - 7	43,000.
		7 - 8	79.
		8 - 9	29/22.3
SS09	4.0	0.0 - 0.2	7,800.
		0.2 - 1	950.
		1 - 2	94,000.
		2 - 3	63,000.
		3 - 4	68,000.
		4 - 5	25,000/13,200
		5 - 6	600.
		6 - 7	25.
		7 - 8	8.6
		8 - 9	10.3
		9 - 10	11.
SS10	4.0	0.0 - 0.2	17,200.
		0.2 - 1	238,000/299,000
		1 - 2	14,200.

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS10		2 - 3	730.
		3 - 4	2,100.
		4 - 5	2,040.
		5 - 6	490.
		6 - 7	570.
		7 - 8	15.4
		8 - 9	10.5
SS11	3.5	0.0 - 0.2	5,400.
		0.2 - 1	3,200.
		1 - 2	72,000.
		2 - 3	9,000.
		3 - 4	220.
		4 - 5	57.
		5 - 6	8,600.
		6 - 7	153/157
		7 - 8	14.2
SS12	4.0	0.0 - 0.2	9,800/11,600
		0.2 - 1	4,300/5,400
		1 - 2	58,000.
		2 - 3	26,900.
		3 - 4	67,000.
		4 - 5	7,300.
		5 - 6	56,000.
		6 - 7	1,740.
		7 - 8	104.
		8 - 9	22.3
SS13	4.3	0.0 - 0.2	7,700.
		0.2 - 1	6,300.
		1 - 2	7,500.
		2 - 3	2,200.
		3 - 4	3,100.
		4 - 5	850.
		5 - 6	58.
		6 - 7	5,100.
		7 - 8	156.
		8 - 9	12.8
SS14	NE	0.0 - 0.2	4,900.
		0.2 - 1	4,510.
		1 - 2	333.
SS15	4.2	0.0 - 0.2	7,100.
		0.2 - 1	20,000.
		1 - 2	12,300.
		2 - 3	23.9

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS15		3 - 4	121.
		4 - 5	13.8
		5 - 6	16.7
		6 - 7	33.
		7 - 8	10.1
		8 - 9	10.5
SS16	3.0	0.0 - 0.2	10,600.
		0.2 - 1	10,600.
		1 - 2	3,940.
		2 - 3	393.
		3 - 4	3.1
		4 - 5	172.
SS17	4.0	0.0 - 0.2	6,100.
		0.2 - 1	16,900/16,400
		1 - 2	9,700.
		2 - 3	5,400.
		3 - 4	460.
		4 - 5	25.3
		5 - 6	10.1
		6 - 7	61.
		7 - 8	8.3
		8 - 9	5.6
SS18	4.0	0.0 - 0.2	8,400.
		0.2 - 1	7,900.
		1 - 2	5,800.
		2 - 3	2,320.
		3 - 4	1,630.
		4 - 5	289/340
		5 - 6	9.8
		6 - 7	10.3
		7 - 8	7.3
		8 - 9	7.6
SS19	2.5	0.0 - 0.2	7,300.
		0.0 - 0.2	43/44
		0.2 - 1.0	51.
SS20	2.2	0.0 - 0.2	1,130.
		0.2 - 1.0	98.
SS21	2.6	0.0 - 0.2	61.
		0.2 - 1.0	1,370.
SS22	3.3	0.0 - 0.2	54.
		0.2 - 1	20.7
		1 - 2	410.
		3 - 4	92.

TABLE 1
Summary of On-Site Lead Results
Dutch Boy Site: Chicago, Illinois

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS22		4 - 5	11.7
		5 - 6	10.
SS23	2.7	0.0 - 0.2	123.
		0.2 - 1.0	250/260
SS24	2.7	0.0 - 0.2	410.
		0.2 - 1.0	260.
SS25	2.6	0.0 - 0.2	1,740.
		0.2 - 1.0	770.
SS26	2.8	0.0 - 0.2	400.
		0.2 - 1.0	5,900.
		1 - 2	1,470.
SS27	1.9	0.0 - 0.2	16,300.
		0.2 - 1.0	480.
SS28	NE	0.0 - 0.2	8,300.
		0.2 - 1.0	6,700.
SS29[1]	2.9	0.0 - 0.2	74.
		0.2 - 1.0	44/38
SS30[1]	4.6	0.0 - 0.2	310.
		0.2 - 1	1,310/1,390
SS31	5.1	0.0 - 0.2	7,100/7,400
		1 - 2	2,070.
		2 - 3	790.
		3 - 4	650.
		4 - 5	4,000.
		5 - 6	490/370
SS32	2.3	0.0 - 0.2	1,400.
		0.2 - 1	63.
		1 - 2	45/55
SS33	2.9	0.0 - 0.2	7,500.
		0.2 - 1	9,100.
		1 - 2	31,800.
		2 - 3	147.
SS34	4.0	0.0 - 0.2	8,400.
		0.2 - 1	1,440.
		1 - 2	52.
		2 - 3	185.
		3 - 4	106.
SS35[1]	NE	0.0 - 0.2	410.
		0.2 - 1	17.
SS36	2.5	0.0 - 0.2	6,500.
		0.2 - 1	1,320.
SS37	3.0	0.0 - 0.2	6,200.
		0.2 - 1	5,800.

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS37		1 - 2	1,910.
		2 - 3	6.6/5.6
		3 - 4	4.6/4.6
SS38	3.7	0.0 - 0.2	6,100.
		0.2 - 1	3,200/2,500
		1 - 2	4,500.
		2 - 3	1,230.
		3 - 4	6.
SS39[1]	4.3	0.0 - 0.2	460.
		0.2 - 1	55.
SS40	2.7	0.0 - 0.2	18,300.
		0.2 - 1	2,130.
		1 - 2	228.
		2 - 3	5.5
SS41	3.4	0.0 - 0.2	5,900.
		0.2 - 1	4,800.
		1 - 2	750.
		2 - 3	430.
		3 - 4	10.6
SS42	2.7	0.0 - 0.2	1,060.
		0.2 - 1	11,300.
		1 - 2	1,470/1,700
		2 - 3	5.7
SS43[1]	4.1	0.0 - 0.2	25.1
		0.2 - 1	13.2
SS44[1]	NE	0.0 - 0.2	14.3
		0.2 - 1	22.3/19.6
SS45	2.9	0.0 - 0.2	1,900.
		0.2 - 1	4,100.
		1 - 2	2,900.
		2 - 3	420.
SS46[1]	N/A	N/A	N/A
SS47	1.8	0.0 - 0.2	18.1
		0.2 - 1	880/700
SS48	2.6	0.0 - 0.2	540.
		0.2 - 1	1,720.
		1 - 2	1,210/1,810
		2 - 3	7.3
SS49	2.6	0.0 - 0.2	800/590
		0.2 - 1	1,380.
		1 - 2	1,220.
		2 - 3	6.2/12.9
SS50	2.6	0.0 - 0.2	730.

Sample Location	Base of Fill (ft bgs)	Depth (ft bgs)	Lead (mg/kg)
SS50		0.2 - 1	6,700.
		1 - 2	1,860.
		2 - 3	8.4
SS51	2.7	0.0 - 0.2	880/780
		0.2 - 1	2,820.
		1 - 2	7,600.
		2 - 3	530.
SS52[1]	4.3	0.0 - 0.2	9.9
		0.2 - 1	41/42
SS53[1]	6.7	0.0 - 0.2	12.3
		0.2 - 1	21.
SS54[1]	5.6	0.0 - 0.2	11.3
		0.2 - 1	740.
SS55	2.2	0.0 - 0.2	17,300.
		0.2 - 1	2,500.
		1 - 2	55.
SS56	2.4	0.0 - 0.2	19.7
		0.2 - 1	1,090.
SS57	N/A	0.0 - 0.2	25,000.
		2 - 3	26,900.
		3 - 4	67,000.
		4 - 5	7,300.
		5 - 6	56,000.
		6 - 7	1,740.
		7 - 8	104.
		8 - 9	22.3

Table 2
Summary of Data from Unpaved Area Boreholes
Dutch Boy Site: Chicago, Illinois

Unpaved Area Borehole	Area Represented (square ft.)	Maximum Depth (feet)	Volume of Soil 0-2 feet (cubic yds)	Volume of Soil > 2 feet (cubic yds)	Total Volume (cubic yds)	Average Concentration 0-2 feet (mg/kg)
SS01	2,455	2	182		182	1,398
SS02	1,544	2	114		114	2,282
SS03	1,792	2	133		133	2,421
SS04	1,165	2	86		86	2,140
SS05	1,619	2	120		120	1,359
SS06	1,231	4	91	91	182	7,150
SS07	1,216	3	90	45	135	10,373
SS08	1,195	7	89	221	310	42,725
SS09	1,296	5	96	144	240	48,160
SS10	1,197	5	89	133	222	116,220
SS11	1,318	6	98	195	293	37,820
SS12	1,212	7	90	224	314	32,010
SS13	1,244	7	92	230	323	7,040
SS14	1,056	2	78		78	2,461
SS15	1,345	2	100		100	14,860
SS16	1,073	2	79		79	7,270
SS17	2,145	3	159	79	238	12,120
SS18	1,490	4	110	110	221	6,900
SS31	871	5	65		65	1,760
SS32	567	2	42		42	190
SS33	1,478	2	109		109	20,290
SS34	952	2	71		71	1,442
SS37	929	2	69		69	3,895
SS38	1,541	2	114		114	4,000
SS40	1,426	2	106		106	2,796
SS41	1,549	2	115		115	2,885
SS42	1,530	2	113		113	5,419
SS45	1,501	2	111		111	3,280
SS48	834	2	62		62	1,497
SS49	1,249	2	93		93	1,232
SS50	718	2	53		53	3,683
SS51	854	2	63		63	5,011
Totals	41,592		3,081	1,474	4,555	

Table 3 Cost Summary for Alternative 1 Cover All Unpaved Area Soils Remove and Close USTs and Debris Pile					
Alternative 1	Unit Cost ($/unit)	Units		Notes	Cost
Soil Cover (includes delivery, placement, compaction, vegetation)	$20	10,783	(yd3)	1,2	$215,662
Remove and close USTs	$1.25	150,000	(gal)	1	$187,500
Remove and dispose Debris Pile	$20	800	(yd3)	1	$16,000
Maintenance	$7,500	30	(yrs)	3	$115,293
Engineering Design	10%				$53,446
Project Management	10%				$58,790
Contingency	15%				$97,004
TOTAL					$743,695

Notes:

1. Cost estimate from RS Means Co. (1998)
2. Volume estimate assumes a depth of 7 feet to cover unpaved areas; 3 feet to bring level with concrete pavement and 4 feet of cover above pavement, with a 3:1 slope for drainage and settlement
3. Net present worth analysis using 30 year duration and 5% discount rate

Table 4 Cost Summary for Alternative 2 Excavate, Treat, and Off-Site Disposal of Two Feet of Soil in Principal Threat Area Cover All Unpaved Area Soils Remove and Close USTs and Debris Pile					
Alternative 2	Unit Cost ($/unit)	Units		Notes	Total Cost
Excavate principal threat wastes	$5	642	(yd3)	1	$3,190
Transportation to Peoria, IL	$39	642	(yd3)	2	$25,032
Treat soil with solidification/stabilization	$68	642	(yd3)	2	$43,646
Disposal at PDC Subtitle C landfill	$68	802	(yd3)	2	$54,156
Soil Cover (includes delivery, placement, compaction, vegetation)	$20	11,425	(yd3)	1,2	$228,499
Remove and close USTs	$1.25	150,000	(gal)	1	$187,500
Remove and dispose Debris Pile	$20	800	(yd3)	1	$16,000
Maintenance Costs	$7,500	30	(yrs)	3	$115,293
Engineering Design	10%				$67,332
Project Management	10%				$74,065
Contingency	15%				$122,207
TOTAL					$936,921

Notes:

1. Cost estimate from RS Means Co. (1998)
2. Volume estimate assumes a depth of 7 feet to cover unpaved areas; 3 feet to bring level with concrete pavement and 4 feet of cover above pavement, with a 3:1 slope for drainage and settlement
3. Net present worth analysis using 30 year duration and 5% discount rate

Table 5
Cost Summary for Alternative 3
Excavate, Treat, and Off-Site Disposal of Top 2 feet Unpaved Area Soils
Remove and Close USTs and Debris Pile

Alternative 3	Unit Cost ($/unit)	Units		Notes	Total Cost
Excavate unpaved area soil down to 2 feet	$5	3,081	(yd3)	1	$15,313
Transportation to Peoria, IL	$39	3,081	(yd3)	2	$120,159
Treat soil with stabilization/solidification	$68	3,081	(yd3)	2	$209,508
Disposal at PDC RCRA Subtitle C landfill	$68	3,851	(yd3)	2,3	$261,885
Remove and Dispose USTs	$1.25	150,000	(gal)	1	$187,500
Remove and Dispose Debris Pile	$20	800	(yd3)	1	$16,000
Backfill and restore Site	$16	3,081	(yd3)	1	$49,296
Engineering Design	10%				$85,966
Project Management	10%				$94,563
Contingency	15%				$156,028
TOTAL	$322	3,081	(yd3)		**$1,196,218**

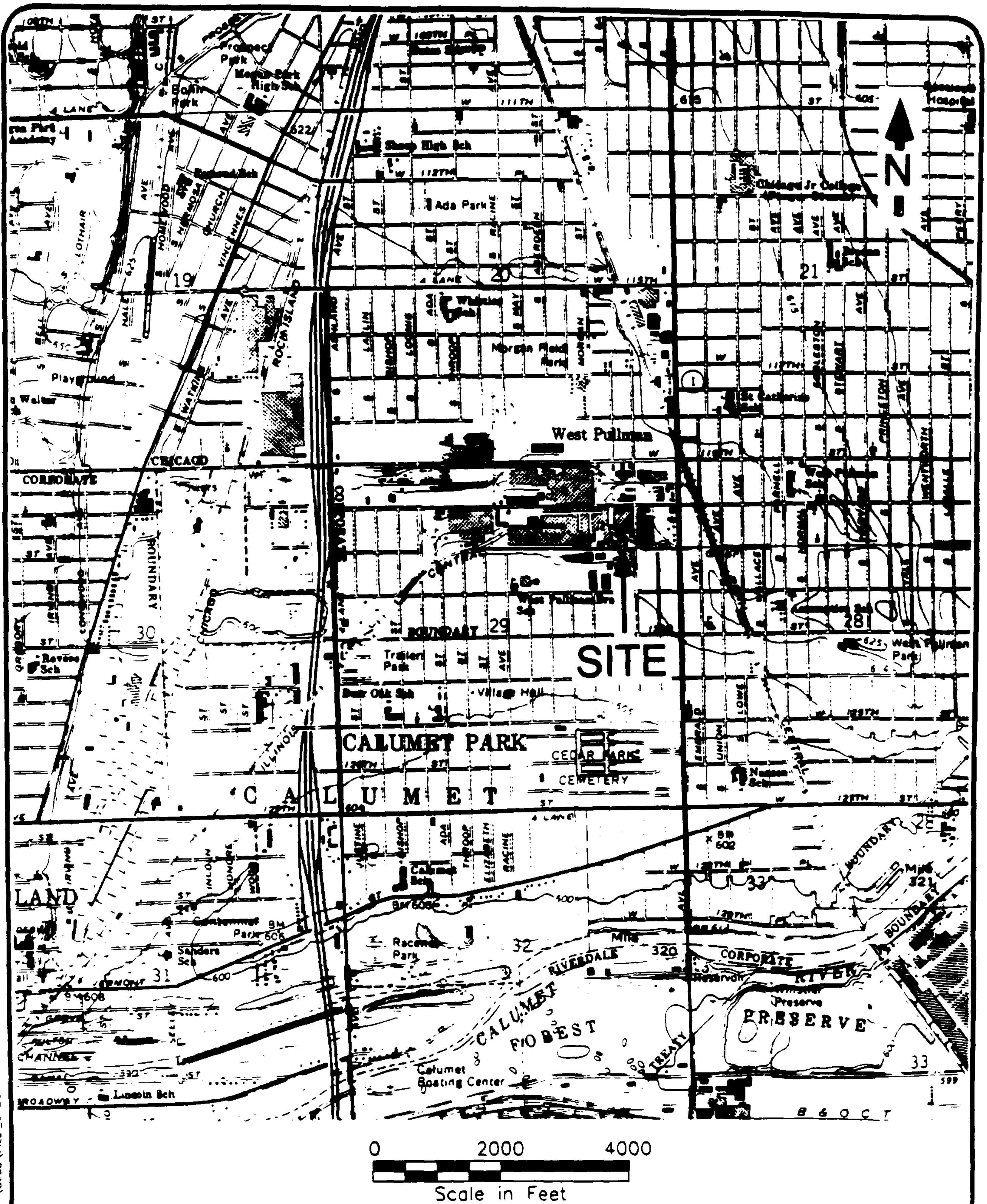
Notes:
Alternative 2
2. Cost estimate from Peoria Disposal Co. (1998)
3. Assumes a volume increase of 25% from S/S treatment and disposal at the PDC RCRA Subtitle C landfill

Table 6
Cost Summary for Alternative 4
Excavate, Treat, and Off-Site Disposal of All Unpaved Area Soils with Lead > 1,400 mg/kg
Remove and Close USTs and Debris Pile

	Unit Cost ($/unit)	Units		Notes	Total Cost
Excavate unpaved area soil down to 2 feet	$5	3,081	(yd3)	1	$15,313
Excavate unpaved area soil below 2 feet	$5	1,474	(yd3)	1	$7,326
Transportation to Peoria, IL	$39	4,555	(yd3)	2	$177,645
Treatment	$68	4,555	(yd3)	2	$309,740
Disposal at PDC Subtitle C landfill	$68	5,694	(yd3)	2,3	$384,328
Remove and close USTs	$1.25	150,000	(gal)	1	$187,500
Remove and dispose Debris Pile	$20	800	(yd3)		$16,000
Backfill and restore site	$16	4,555	(yd3)	1	$74,748
Engineering Design	10%				$117,260
Project Management	10%				$128,986
Contingency	15%				$212,827
TOTAL	$314	4,555	(yd3)		$1,631,672

Notes:
1. Cost estimate from RS Means Co. (1998)
2. Cost estimate from Peoria Disposal Co. (1998)
3. Assumes a volume increase of 25% from S/S treatment and disposal at the PDC RCRA Subtitle C landfill

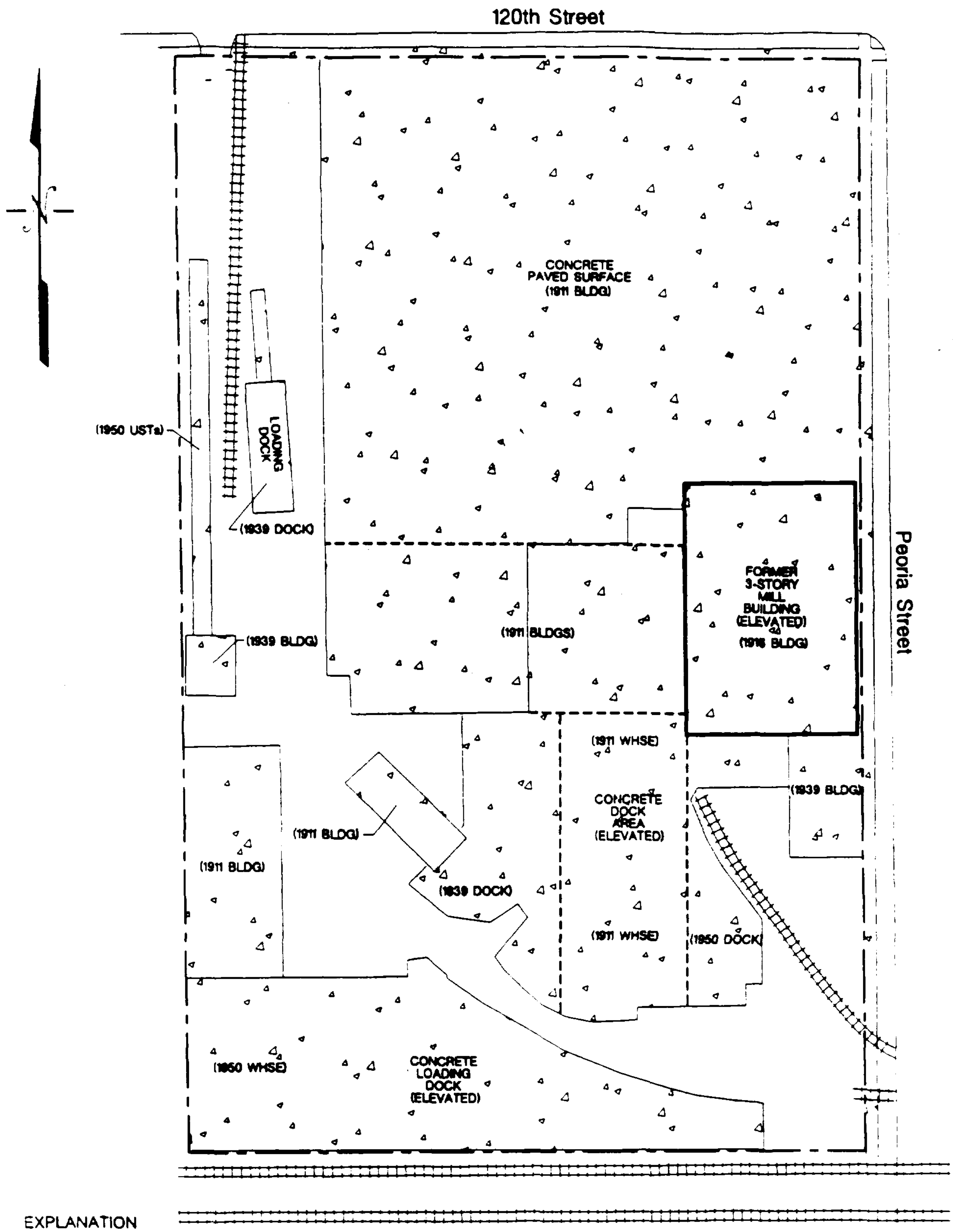
FIGURES



SOURCE: USGS 7.5 MINUTE (TOPOGRAPHIC) SERIES; BLUE ISLAND, ILLINOIS QUADRANGLE

ENVIRON	SITE LOCATION MAP DUTCH BOY SITE CHICAGO, ILLINOIS	Figure 1

c:\acad\FILE_SPECIFICATION



EXPLANATION

Concrete area
Asphalt
Soil
(1911) Date of earliest Sanborn Map showing construction or pavement in area

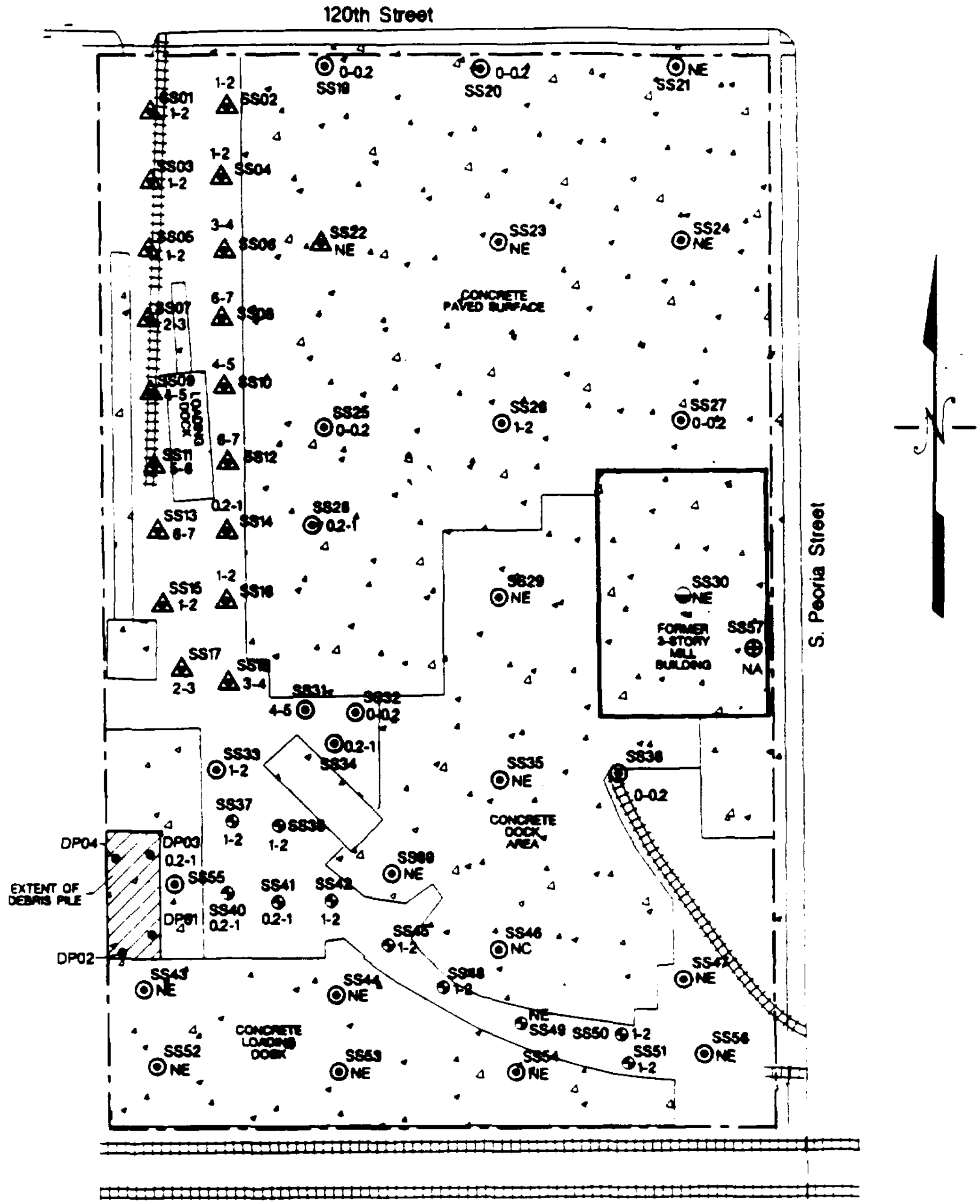
WHSE Warehouse
BLDG Building
DOCK Loading dock
USTs Underground storage tank

0 90 180
Scale in Feet

ENVIRON

SITE LAYOUT
DUTCH BOY SITE
CHICAGO, ILLINOIS

Figure 2



EXPLANATION

- ▲ Soil core to 5 feet below base of fill
- ◎ Soil core to base of fill
- Soil core to base of fill; includes asbestos analysis
- ● Debris sample
- ⊕ Sediment sample
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- 0.2-1 Maximum depth (in feet) at which lead was detected in soils >1,400 mg/Kg
- NE: No exceedence of 1,400 mg/Kg detected
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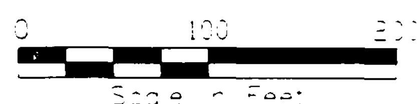
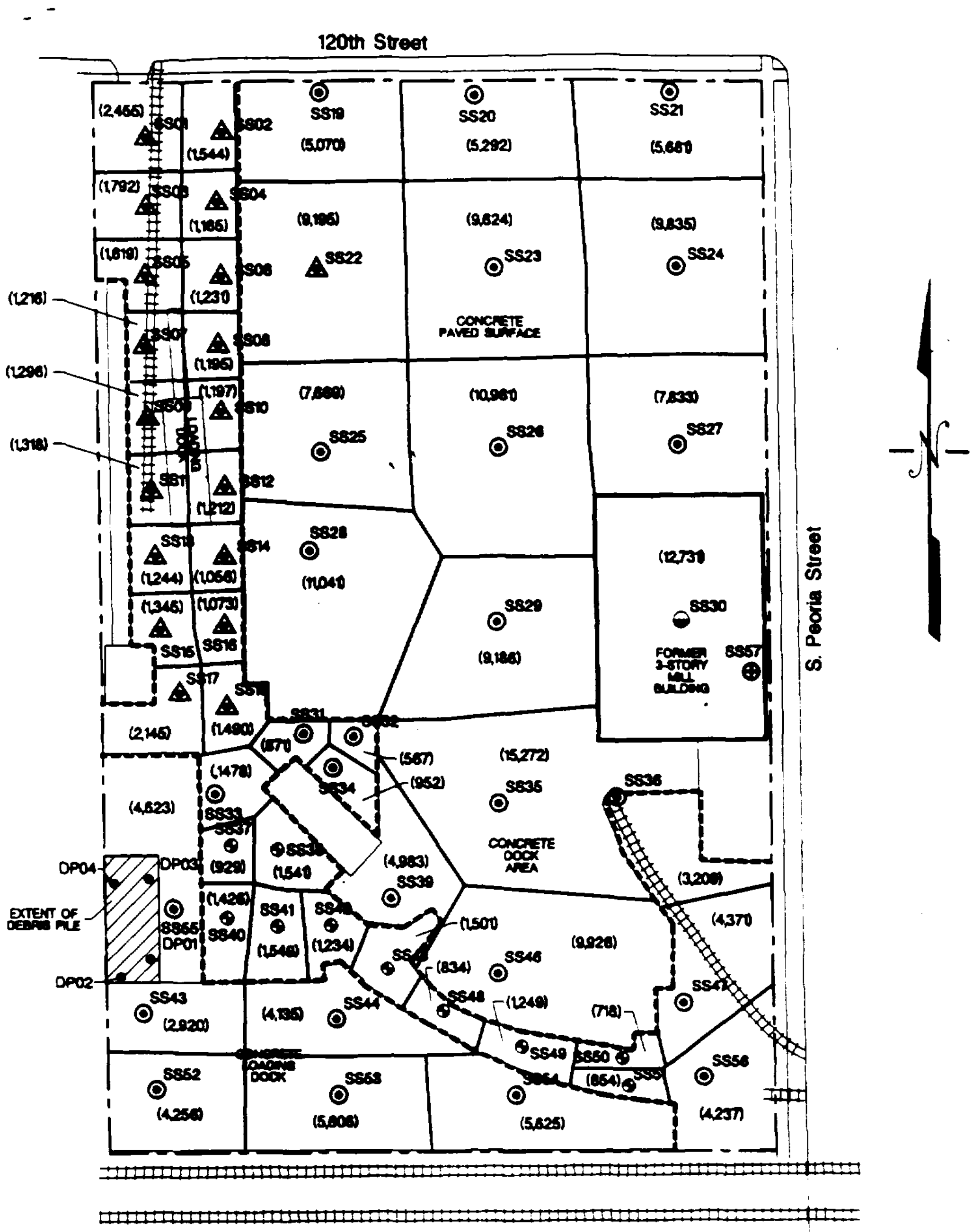


NOTE: Sampling intervals at each core location are detailed in report.

ENVIRON	MAXIMUM DEPTH (IN FEET) OF LEAD DUTCH BOY SITE CHICAGO, ILLINOIS	Figure 3



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——— Boundary representing extent of contamination associated with specific boreholes

- - - - Boundary between paved and unpaved areas

(2,455) Area of polygon in square feet (ft^2)

0 100 200

Scale in Feet

NOTE: Sampling intervals at each core location are detailed in report.

ENVIRON

BOREHOLE-BASED AREAL EXTENT OF CONTAMINATION POLYGONS
DUTCH BOY SITE
CHICAGO, ILLINOIS

Figure 4

VIA TELEFAX AND
CERTIFIED MAIL
RETURN RECEIPT REQUESTED

October 19, 1998

Ranjit Machado
Environ International Corporation
4350 N. Fairfax Drive, Suite 300
Arlington, VA 22203

Dear Mr. Machado:

The U.S. Environmental Protection Agency (EPA), the City of Chicago, and Technical Outreach Services for Communities (TOSC) have reviewed the July 1998 "Risk Management Plan- Dutch Boy Site". The EPA hereby approves the document with the following modifications, which are listed in Section A below:

A. **MODIFICATIONS**

1. Page 1, Paragraph 3, third sentence- this sentence is replaced with: "The depth of contamination exceeding the cleanup level (CUL) of 1400 ppm was two feet or less in 18 of the 32 sample locations where the boreholes were extended to a depth of more than two feet. At 14 sample locations, the depth to which lead was found at concentrations exceeding the cleanup level was greater than two feet and as much as 7 feet below ground surface."

2. Page 1, Paragraph 3, fourth sentence- this sentence is replaced with: "Based on the data presented in the November 19, 1997 "Draft Extent of Contamination" Report, the volume of soil in the unpaved areas that exceeds the CUL is estimated to be 5000 cubic yards." Table 2 is also revised as shown in Enclosure 1.

3. Page 1, Paragraph 4, first sentence- "and excavation and removal of soil contamination with lead above the cleanup level of 1400 ppm" is added to the end of this sentence.

4. Page 1, Paragraph 5- this paragraph is rewritten as follows:

   "The most appropriate technologies were engineering/institutional controls through containment of the Site with a compacted soil cover, stabilization and solidification of the contaminated soil matrix, which immobilizes the lead, and excavation/treatment/disposal off-site at RCRA Subtitle C landfill. Complete excavation to 1400 ppm lead of the unpaved, contaminated soils and engineering/institutional controls for the paved, contaminated soils were

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10. Add Figure ES-1, as follows:

"SCHEDULE FOR REMEDIAL DESIGN AND REMEDIAL CONSTRUCTION START FOR PREFERRED ALTERNATIVE

<u>Event/Document</u>	<u>Due Date</u>
60 Percent Design, including draft QAPP, HSP, Cost Estimate, Project Schedule	December 15, 1998
Final Design, including final QAPP, HSP, Cost Estimate, Project Schedule	30 days after receipt of EPA comments on 60 % Design
Begin Construction of Preferred Alternative	April 30, 1999
Complete Construction of Preferred Alternative	Per schedule in approved Final Design"

11. Page 8, first full sentence- this sentence is deleted from the report.

12. Page 8, "Remedial Strategies", Second Paragraph, first sentence- "and excavation" is added to the parenthetical phrase in this sentence.

13. Page 9, first sentence- "or essentially eliminated via excavation and proper disposal of lead-contaminated soils" is added to the end of this sentence.

14. Page 9, "Containment Technologies", Second Paragraph- the third and fifth sentences are deleted from this paragraph.

15. Page 12- a new section is added to the bottom of this page as follows:

"D. <u>Excavation/Disposal</u>

Excavation removes all lead above a given cleanup level (for the Dutch Boy Site, 1400 ppm). Excavated areas are then backfilled. The excavated material is treated, as necessary, and is transported to an appropriate landfill for proper disposal."

16. Page 13, first sentence- "excavation/disposal" is inserted between "immobilization," and "and".

17. Page 13, third sentence- "and excavation/disposal" is added to the end of this sentence.

18. Page 16, first line- "the Peoria Disposal Company's" is replaced with "a".

19. Page 16, "Alternative 3", third sentence- this sentence is replaced with "Excavated soil would be treated and disposed off-site."

20. Page 16, "Alternative 4", second sentence- this sentence is replaced with "Excavated soil would be treated and disposed off-site."

21. Page 17, First Paragraph, third sentence- "therefore, differentiation between alternatives is based primarily on cost" is replaced with "; however, only Alternative 4 meets all ARARs and is fully compatible with projected future uses of the unpaved areas of the Site."

22. Page 17, Second Paragraph, fourth sentence- this sentence is deleted.

23. Page 17, Second Paragraph, last sentence- "pursuant to applicable regulations" is inserted between "removed" and "under" in this sentence.

24. Page 17, Third Paragraph, sixth sentence- this sentence is deleted.

25. Page 18, First Full Paragraph, third and fourth sentences- these sentences are replaced with: "This alternative also costs the most, but is the only alternative that meets all ARARs and is the most compatible with projected future uses of the unpaved areas of the Site."

26. Page 18, Section B, "Recommended Alternative", First Paragraph- this paragraph is replaced with:

    "The recommended alternative for the Dutch Boy Site is Alternative 4. This alternative provides for excavation and proper disposal of all soils in the unpaved areas that exceed the applicable on-site soil cleanup level of 1400 ppm lead. This alternative eliminates the potential for inhalation and ingestion of unacceptable levels of lead in unpaved, on-site soils. This alternative also includes a provision for repair of, and O&M for, on-site paved surfaces and deed restrictions to ensure that exposure does not occur to soil with lead concentrations exceeding the CUL, and that any intrusive future activities are properly monitored and any contaminated soil that is so generated is disposed of properly. Additionally, the Debris Pile and contaminated surrounding soils, if any, are removed and properly disposed of under the preferred alternative. The USTs will be closed as required by applicable laws and regulations. Alternative 4 meets all ARARs and is the most compatible with anticipated future uses of unpaved, on-site soils."

27. Page 18- Section C is added as follows:

"C. Implementation

The schedule for implementation of the Recommended Alternative is outlined in Figure ES-1. The design documents (60% and 100%) for Alternative 4 will include an RD/RA Work Plan, Plans, Specifications, QAPP, HSP, Cost Estimate, and Project Schedule. The QAPP will include a plan for sampling under paved areas of the Site."

B. COMMENTS NOT REQUIRING MODIFICATIONS

This section presents comments that do not constitutemodifications but clarify or supplement the report or address future implementation issues.

1. General

   a. In order to comply with ARARS, Alternatives 1 through 3 would need to utilize a RCRA Subtitle C cap or equivalent. This requirement applies due to the fact that some of the soils failed the TCLP test for lead, thus making these soils characteristic hazardous waste. This comment was not required as a modification since the requirement for a RCRA Subtitle C cap would only increase the costs of Alternatives 1 through 3 and, thus, only further support the selection of Alternative 4 as the Recommended Alternative.

   b. The term "principle threat waste" must be excluded from all future site documents; the applicable on-site cleanup level is 1400 ppm lead. This comment is not a modification since it does not change the selection of the Recommended Alternative.

   c. At some point in the near future, a much more comprehensive site history must be submitted to EPA. Although not specifically required under the Order, such a document would greatly assist in future site decisions, considerations, and implementation issues.

2. TOSC "Section II" Comments

These comments are include in this submittal as Enclosure 1.

3. Cost Estimates

EPA recognizes that some of the modifications listed above may serve to increase or decrease the costs for the various alternatives. Rather than modify the cost estimates at this time, the cost estimate for the preferred alternative will be updated during the remedial design phase for the on-site work.

C. CITY OF CHICAGO COMMENTS

The comments of the City of Chicago are included in this submittal as Enclosure 2. In general, the City of Chicago comments are consistent with the modifications listed above and provide further reasons for selecting Alternative 4 over Alternative 2 for unpaved on-site soils. The primary additional modification requested by the City of Chicago is removal of all soils with lead concentrations greater than 1400 ppm under paved surfaces. Under the Order for removal actions at the Dutch Boy Site, EPA does not believe it has the authority to order this additional modification at the current time.

The schedule in Figure ES-1 will govern the Remedial Design for and subsequent implementation of the Recommended Alternative. This is EPA's final comment letter regarding the RMP for on-site actions. EPA encourages you to reprint the document so as to incorporate the modifications; however, any reprinting of the document will not serve to extend the schedule in Figure ES-1 in any way. Please contact me at (312) 886-4742 if you have any questions concerning this letter.

Sincerely,

Brad Bradley
On-Scene Coordinator

Enclosures

cc: David Reynolds, City of Chicago
Diane Lickfelt, TOSC
Tony Davenport

14. Pages 17 and 18, Section VII.A., paragraphs 1-5.

Discussions about alternatives 1 through 3 should be modified to reflect that they are not protective of human health.

It should be noted that we have not proposed changes to alternatives 1 through 3 because we believe that they are not protective of human health and do not meet ARARs. However, if the decision was made (and approved by U.S. EPA) to try to make revisions to alternatives 1 through 3, TOSC requests another review of the RMP.

15. Irrespective of the alternative chosen, it is our opinion that the deed for the Site will need to be restricted to industrial use. More restrictive restrictions may be necessary, depending upon the removal/remedial option used at the Site. The deed should also state the locations and concentrations of lead in any soils left on Site.

16. Prior to the implementation of the approved removal/remedial option, a design document should be submitted. This documentation should contain engineering specifications and details about (but not limited to):

- the excavation of all soils in the unpaved areas that contain lead at concentrations greater than 1400 mg/kg
- the treatment and disposal of soil off-site
- confirmation sampling and analysis
- sampling of the paved areas, contingency strategies in the event that soils having lead concentrations greater than 1,400 mg/kg are found in the paved areas
- tank removal
- debris disposal.

This design document should be subject to standard review procedures, including a comment period.

SECTION II

The comments presented in this section have less impact on the choice of a removal/remedial action for the site. Nevertheless, we believe that it is important to point out what, in our opinion, are deficiencies and/or misleading statements.

1. Page 3, Section II.A. paragraph 2, line 4 reads: "...ENVIRON prepared the *Extent of Contamination Summary, Dutch Boy Site, Chicago Illinois* (EOC) dated November 19, 1997."

   This title of the November 19, 1997 document is inconsistent with the title listed in Section VIII, REFERENCES (page 19) and with the title that appears on cover of the document itself. Listing this document as a summary and without "draft" at the beginning is misleading. It implies that the November 19 document is a final version. U.S. EPA has informed us that the EOC has not been completely accepted, so making the notation that the November 19 document is still a draft is very important. The title should be corrected in the RMP. U.S. EPA refers to it as a second draft so the most appropriate title would be: "*Second Draft* Extent of Contamination Survey, Dutch Boy Site, Chicago Illinois."

2. Page 4, Section II.B., paragraph 2, lines 5-7 reads: "Although most of the properties surrounding the Site are currently abandoned or vacant, it is likely that historical activities at these facilities have influenced lead concentrations in soils in the Site vicinity."

   The distinction should be made that most of the *previously industrialized* properties surrounding the Site are currently abandoned or vacant, because most of the properties, as a whole, surrounding the site are residential (see Figure 5 in the November 19, 1997 2^{nd} *Draft* EOC). Additionally, no evidence has been presented to support the second portion of the above statement (i.e., "it is likely that historical activities at these facilities have influenced lead concentrations in soils in the Site vicinity."). It is only conjecture and, therefore, should be omitted. Unless evidence is provided to back up this statement, it would be best to strike this statement from future versions of the RMP or other future documents.

3. Page 5, Section III, paragraph 2, lines 4-5 reads: " The areas most effected *(sic)* are the former rail spurs leading to the loading dock in the northwestern portion of the Site. Figure 3 shows the extent of contamination exceeding the cleanup goal."

   It would be more accurate to say that the most affected areas are the unpaved portions in the western region of the site and the paved areas under and adjacent to the former mill building. Additionally, Figure 3 is not sufficiently illustrative of the extent of contamination. We have scanned and modified Figure 4 to create three figures that better depict the extent of vertical and horizontal contamination (see attached).

4. Page 5, Section III, paragraph 2, lines 5-6 reads: "Surface soil (i.e., 0.0 – 0.2 feet below ground surface) lead concentration on the Site are in the 5,000 to 10,000 mg/kg range."

   When considering the area of the former rail spurs leading to the loading dock, it is more accurate to say that the surface soil lead concentration ranges from 330 to 17,200 mg/kg. But as the soil in the entire unpaved area, along with the sediments in the vicinity of the former Mill Building, should be considered, the range of lead concentrations is 330 to 25,000 mg/kg. The following statement should also be added: "The highest concentration, 300,000 mg/kg, of lead detected in On-Site soil was detected in the sample collected from SS10 at a depth of 0.2 to 1 feet." It is significant, and worthy of mention, that this concentration is equivalent to **30% lead** and was detected just below the ground surface.

5. Page 5, Section III, paragraph 3

   There are numerous problems with this paragraph. First of all, there is insufficient sampling of the unpaved areas to make such sweeping statements as "there are very few locations where soil lead concentrations exceed 1,400 mg/kg or that elevated areas... were not contaminated by Site operations. Secondly, since there is no scientific basis on which to conclude that lead is not susceptible to migration (no pH data for soils, etc.) or that contamination under the paved areas is limited; the conclusion that the paved areas do not need to be addressed can not be made.

6. Page 7, Section IV.A., paragraph 1, line 6 reads: "This procedure (called the method of Thiessen's polygons) assumes that..."

   The Thiessen method is inappropriate since this method attempts to allow for non-uniform distribution of data by providing a weighting factor for each sampling point. The method does not allow for orographic influences and assumes a linear relationship between concentrations obtained at sampling locations and assigns each areal segment to the nearest sampling location. As such, while this method could be used to make cost estimates, it should not be used to delineate the extent of contamination or to determine what soils will be excavated.

7. p. 8, Section IV.C., paragraph 2. ENVIRON correctly states that "other issues and problems .... are the final disposal of underground storage tanks (USTs) and the debris pile".

   It should be noted that the tanks must be sampled before a remedial option for the UST(s) can be proposed. Additionally, during excavation of the tanks, the soil surrounding the tanks will need to be sampled to ensure that contamination of this material has not occurred. Depending on the final disposal method for the debris pile, additional sampling of this material may be required.

8. p. 14, Section IV.A.1., line 4. ENVIRON states that there are "low levels of asbestos" in the materials present in the debris pile, and that due to the "low levels of asbestos, disposal in a Subtitle D landfill would be feasible."

   Concentrations ranging from 4-11% (see EOC Report, dated November 19, 1997) are not low levels. Has sufficient information been gathered to say that this material can be disposed of at a Subtitle D landfill?

9. Table 2 (no page number given)

   In reviewing the data in this table, three errors were found. We have attached a revised version of Table 2, correcting these errors and providing an explanation for the suggested changes (see attached revised Table 2). While the data for SS42 is inconsistent with Figure 4, the error may actually be on the figure and not in the table. Nevertheless, it was more advantageous to use this revised Table 2 to point out the problem. Although not stated on our revised table, correcting these errors slightly alters the total volume of soil to be excavated. Since these volumes should only be used in making cost estimates, not in determining the final volume of soil to be excavated (confirmation samples collected in the floors and sidewalls of the excavation site will be necessary for that), these changes are relatively inconsequential.

10. Tables 3 and 4 (no page numbers given)

As referenced above, we have not discussed Alternatives 1 or 2 in detail. Nevertheless, it should be noted that a 3:1 slope is proposed for the final siting of the backfilled soils. Using a 3:1 slope would result in mounds of soil some 20 feet above ground surface. Soils sloped at a 3:1 ratio would be difficult to maintain and would be subject to erosion. It is likely that large mounds were not actually what ENVIRON meant to propose and, as such, their proposal needs to be stated more clearly.

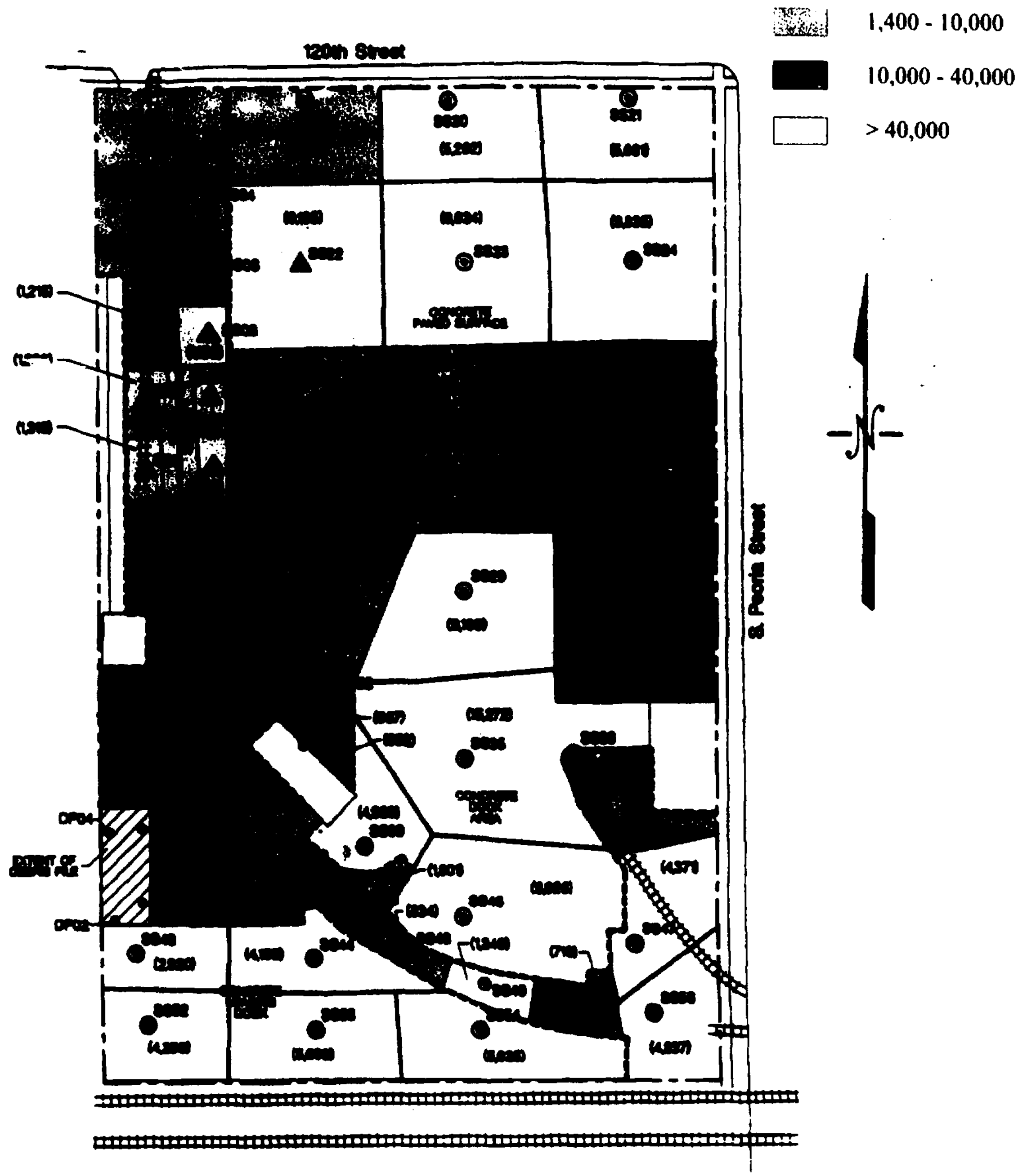
cc: *Brad Bradley, U.S. EPA*
Noemi Emeric, U.S. EPA

Table 2 (revised by TOSC)
Summary of Data from Unpaved Area Boreholes
Dutch Boy Site: chicago, Illinois

Unpaved Area Borehole	Area Represented (square ft.)	Maximum Depth (feet)	Volume of Soil 0-2 feet (cubic yards)	Volume of Soil > 2 feet (cubic yards)	Total Volume (cubic yards)
SS01	2455	2	182	0	182
SS02	1544	2	114	0	114
SS03	1792	2	133	0	133
SS04	1165	2	86	0	86
SS05	1619	2	120	0	120
SS06	1231	4	91	91	182
SS07	1216	3	90	45	135
SS08	1195	7	89	221	310
SS09	1296	5	96	144	240
SS10	1197	5	89	133	222
SS11	1318	6	98	195	293
SS12	1212	7	90	224	314
SS13	1244	7	92	230	323
SS14	1056	2	78	0	78
SS15	1345	2	100	0	100
SS16	1073	2	79	0	79
SS17	2145	3	159	79	238
SS18	1490	4	110	110	221
SS31[a]	**871**	**5**	**65**	**97**	**161**
SS32	567	2	42	0	42
SS33	1478	2	109	0	109
SS34	952	2	71	0	71
SS36[b]	**3209**	**2**	**238**	**0**	**238**
SS37	929	2	69	0	69
SS38	1541	2	114	0	114
SS40	1426	2	106	0	106
SS41	1549	2	115	0	115
SS42[c]	**1530**	**2**	**113**	**0**	**113**
SS45	1501	2	111	0	111
SS48	834	2	62	0	62
SS49	1249	2	93	0	93
SS50	718	2	53	0	53
SS51	854	2	63	0	63
Totals	44801		3319	1571	4890

Notes:
[a] In the original ENVIRON RMP, the volume of soil greater than 2 feet was neglected.
[b] In the original ENVIRON RMP, this soil sample was not included, even though it has contamination greater than 1400 ppm.
[c] The area listed in the Table 2 of the RMP conflicts with the area listed in Figure 4.

Lead Concentration mg/Kg



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——— Boundary representing extent of contamination associated with specific boreholes

– – – – Boundary between paved and unpaved areas

(2,455) Area of polygon in square feet (ft²)

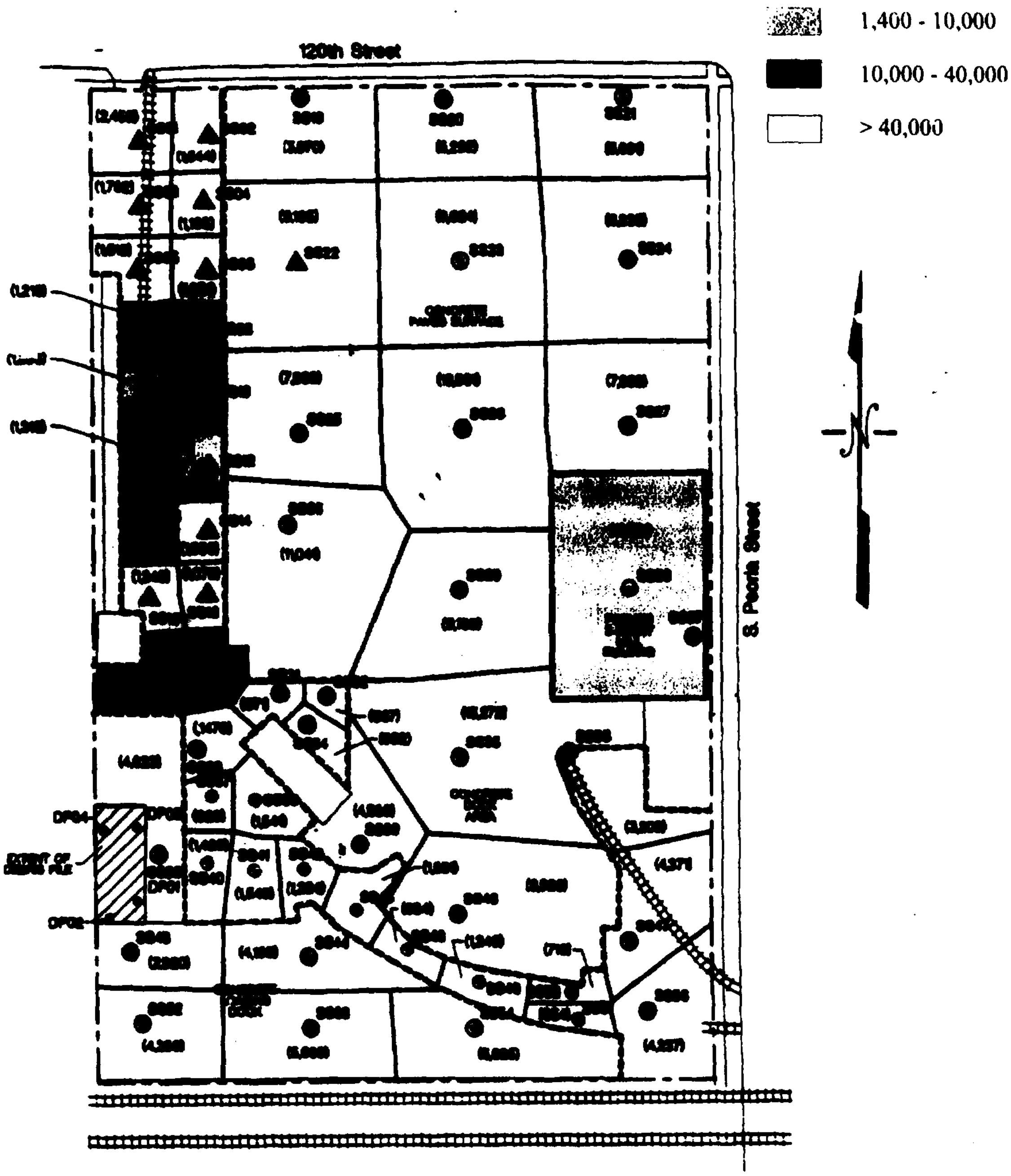
0 100 200

Scale in Feet

NOTE: Sampling intervals at each core location are detailed in report.

ENVIRON	BOREHOLE-BASED AREAL EXTENT OF CONTAMINATION POLYGONS DUTCH BOY SITE CHICAGO, ILLINOIS	Figure 4

Lead Concentration mg/kg



EXPLANATION

- Soil core to 5 feet below base of fill
- Soil core to base of fill
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- Soil sample from below sub-basement
- 0.2-1 Maximum depth (in feet) at which lead was detected in soils >1,400 mg/Kg
- NE: No exceedence of 1,400 mg/Kg detected
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Boundary representing extent of contamination associated with specific boreholes

Boundary between paved and unpaved areas

(2,455) Area of polygon in square feet (ft²)

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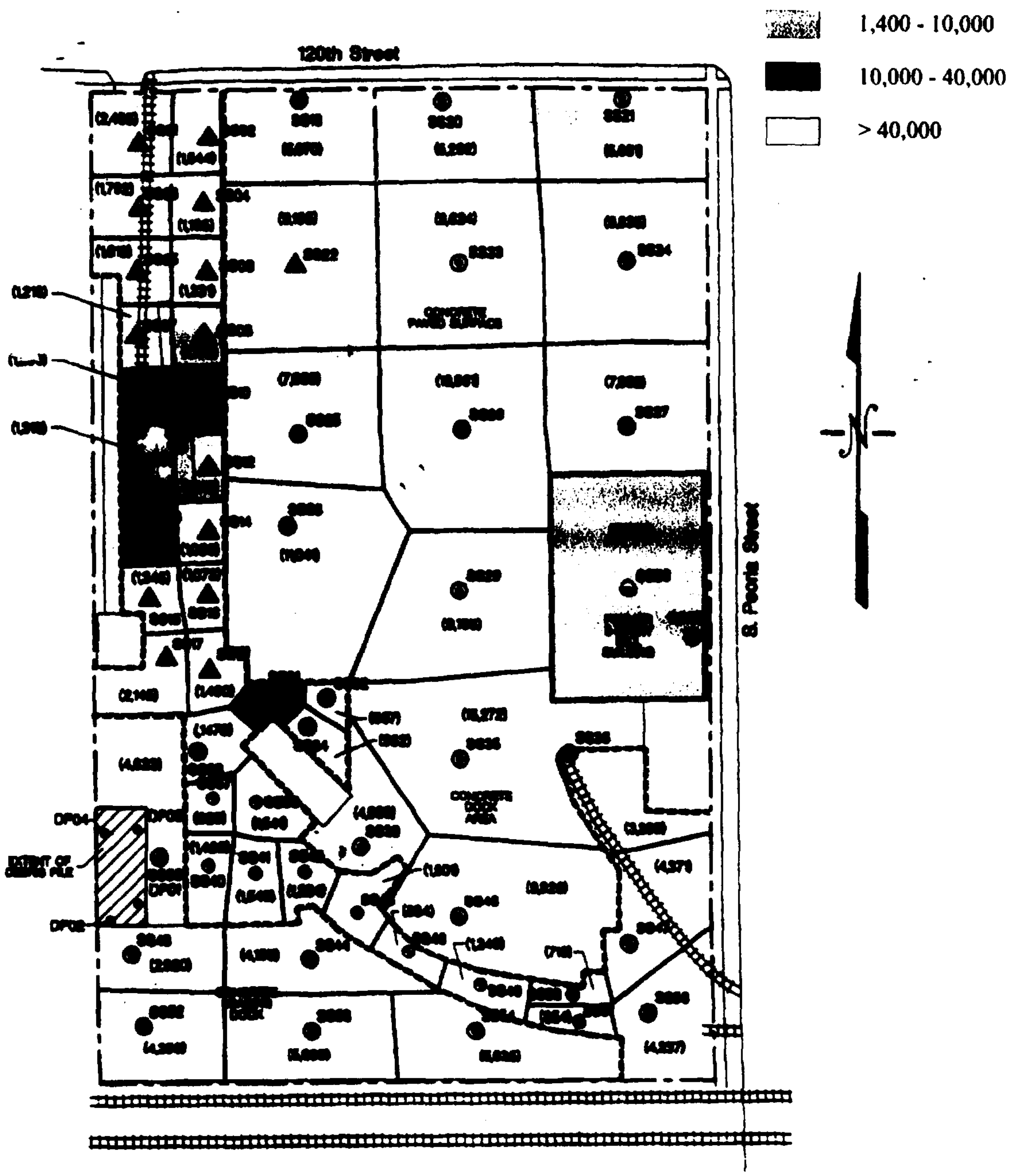
Scale in Feet

NOTE: Sampling intervals at each core location are detailed in report.

ENVIRON	BOREHOLE-BASED AREAL EXTENT OF CONTAMINATION POLYGONS DUTCH BOY SITE CHICAGO, ILLINOIS	Figure 4

Lead Concentration mg/kg
> 4' Below Grade



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Scale in Feet

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ENVIRON	BOREHOLE-BASED AREAL EXTENT OF CONTAMINATION POLYGONS DUTCH BOY SITE CHICAGO, ILLINOIS	Figure 4

City of Chicago
Richard M. Daley, Mayor

Department of Environment

Henry L. Henderson
Commissioner

Twenty-fifth Floor
30 North LaSalle Street
Chicago, Illinois 60602-2575
(312) 744-7606 (Voice)
(312) 744-6451 (FAX)
(312) 744-3586 (TTY)

http://www.ci.chi.il.us

August 31, 1998

VIA FACSIMILE AND U.S. MAIL

Mr. Brad Bradley
Project Manager
U.S. EPA, Region V
77 West Jackson Blvd., SR-J6
Chicago, IL 60604

RE: City of Chicago's comments -- NL Industries, Inc.'s *Risk Management Plan - Dutch Boy Site*, USEPA Unilateral Administrative Order V-W-96-C-347

Dear Mr. Bradley:

The City of Chicago submits the following comments in response to NL Industries Inc.'s Risk Management Plan - Dutch Boy Site, dated July 1998.

City's Interest in the Dutch Boy Site Cleanup

The Dutch Boy Site lies within an approximately 160 acre tax increment financing district in the City known as the West Pullman Industrial Park Conservation Area. A map of the properties within the district is enclosed for your review. The District was formed last year as part of the City's overall brownfields redevelopment strategy aimed at returning this long blighted industrial area to productive use for the benefit of the surrounding community.

The City's goal is to assure that contaminated parcels within the district receive a level of environmental cleanup that is both protective of human health and the environment and adequate to attract new businesses to redevelop the area with viable commercial/industrial enterprises. As you can see from the enclosed map of the District, adequate and appropriate cleanup of the highly contaminated Dutch Boy Site is key, both in size and location, to securing the protection of the surrounding community's health and safety and being able to successfully redevelop the area.

While the City is attempting to work cooperatively with past owners and operators of contaminated properties whenever it can through initiatives like the Illinois Environmental Protection Agency's Site Remediation Program, it is the City's belief that, to the maximum extent possible, those responsible for polluting the area should pay the costs of cleanup. Where cooperation is not possible, the City has instituted litigation against polluters who refuse to clean up their environmental messes. The City has a lawsuit pending against NL Industries, Inc. and the Artra Group whose use of the Dutch Boy Site caused the property to become highly contaminated. In fact, information discovered by the City in its litigation provided the impetus for the issuance of the USEPA's Unilateral Administrative Order against NL Industries Inc. in 1996.

In addition, through the State of Illinois' tax reactivation process, the City came into ownership of the abandoned and tax delinquent Dutch Boy Site in December of last year. Therefore, as an active litigant against the polluters of the Dutch Boy property, as a local government attempting to revitalize the community through a Brownfield's redevelopment program, and as the property owner of the site, the City is extremely concerned with, and has a vital interest in, NL Industries Inc.'s proposed Risk Management Plan (RMP) and USEPA's response to that plan.

NL Industries Inc.'s RMP Does Not Eliminate the Threat of an Imminent and Substantial Endangerment to the Public Health or Welfare or the Environment.

Section 106 of CERCLA provides broad imminent hazard, enforcement, and emergency response powers. Specifically, section 106 authorizes,

> "...such relief as may be necessary to abate such danger or threat ... and such relief as the public interest and the equities of the case may require. The President may also ... take other action under this section including but not limited to, issuing such orders as may be necessary to protect public health and welfare and the environment." 42 U.S.C. § 9606 (Emphasis added.)

The City believes that NL Industries Inc.'s RMP, particularly in regard to the removal of lead contaminated soil, fails to provide the relief envisioned by section 106. The RMP does not adequately or appropriately eliminate the threat of endangerment for the following reasons:

1. The proposed cleanup goal established by the USEPA for lead in the soil at the Dutch Boy Site is 1,400 mg/kg. NL Industries Inc.'s selected alternative (Alternative 2) consists of a limited soil removal action, capping the unpaved soils, and leaving contaminated soils in place under paved areas. After this limited removal action, almost all of the lead-contaminated soil exceeding 1,400 mg/kg would still remain on the site.

The City's position is that all material exceeding the 1,400 mg/kg lead standard must be removed from the site. NL Industries Inc.'s proposal appears to be premised upon an assumption that it can impose or assure that pavement or other cap material will remain in place in perpetuity. However, since NL Industries does not own the site, it is not in a position to insure, through deed restrictions or otherwise, that capped or paved areas will not be disturbed, breached, or removed in the future. In fact, as discussed below in 2., there is evidence that the existing concrete is not an impervious barrier. Therefore, in the absence of any demonstration by NL Industries Inc. that it can assure that the caps and pavement will not be breached in the future, the RMP does not eliminate the threat of a release from the soil and is not protective of human health.

2. The Extent of Contamination Survey, dated November 19, 1997, (ECS) indicates that samples beneath the concrete slab were collected via a geoprobe down to the interface at the base of the fill. Some of the results were far higher than 1,400 mg/kg at depths of 0.2"- 1' (e.g., 5,900 mg/kg at SS26 and 6,700 mg/kg at SS28). In addition, some of the shallow samples (0"-0.2") on the slab are also high (e.g., 7,300 mg/kg a SS19, 16,300 mg/kg at SS27 and 8,300 mg/kg at SS28). It is unclear whether these samples are just below the slab or are from cracks in the slab. If the results are from cracks then the slab is not an impenetrable barrier and contamination removal beneath the slab is required.

3. Based on the sampling results, there is no reason for the depth of excavation to be the same for each area. For example, the excavation near SS10 need not be to the same depth as near SS12, etc. Why not consider varying the actual depth of excavation based upon the sampling results?

4. The logic for selection of Alternative 2 is less than clear. Under NL Industries Inc.'s proposal, approximately 50 percent of the material exceeding 40,000 mg/kg would remain on-site. Logic would appear to dictate that either all of this material or none of it should be removed. What is the logic for removing only 50% of it?

5. In the Executive Summary, the clean-up objective of 1,400 mg/kg is mentioned several times. However, the only utilization of the clean-up objective in the RMP appears to be that the cap for each alternative must cover the entire unpaved area. Why is there no alternative utilizing the clean up standard established by USEPA for the entire site?

6. The ECS also has a table correlating TCLP results with total lead values. Based on the results presented in this table, it can not be inferred that because a sample does not have total lead greater than 1,400 mg/kg that it will not fail the TCLP for lead and, therefore, still be considered hazardous. Thus, hazardous waste could still be left behind in both capped and uncapped areas as presented in the RMP. How does USEPA intend to deal with this issue?

7. The City, as the owner of the property, fully intends to market the property for redevelopment under a Brownfields program being funded, in part, with loan guarantees from the federal government. There is no doubt that the cap materials and areas of pavement will have to be removed for the property to be put back into productive use. There is no reason why any future owner would want to use the concrete that still exists on site for more than parking cars or trucks -- the concrete thickness is unknown (maybe 9"?), the type of reinforcing is unknown, its ultimate integrity based upon past uses is unknown, and there is a basement under part of it.

8. The ECS indicates the presence of "diesel range organics" and "gasoline-range organics"at a variety of sampling locations, but most notably near the USTs and the dock area. The RMP states that these compounds should not affect stabilization efforts, but these compounds should still be addressed from a clean-up standpoint utilizing the appropriate TACO standards.

9. The removal of the debris pile and the USTs is included in all the alternatives. Some criteria should be established for the removal of any contaminated soil associated with the USTs. The City suggests that NL perform confirmation sampling after the removal of each UST for the appropriate compounds based upon the UST's historic use (BTEX and lead for gasoline USTs, PNAs for oil or diesel USTs, etc.). The results of the confirmation sampling should be compared to IEPA's TACO standards for industrial/commercial facilities. If the results exceed the standards, the contaminated soil should be removed and resampling performed until all confirmation sampling results are below the industrial/commercial standards.

10. In regard to the debris, confirmation sampling of the soil under the pile needs to performed once the debris is removed to ascertain whether the soil is contaminated with asbestos. If contaminated the soil needs to be removed.

Not Only Does NL Industries Inc.'s RMP Not Eliminate the Threat of a Release, It Also Fails To Provide, "...Such Relief as the Public Interest and the Equities of the Case May Require."

It is not feasible to expect that a future site user can be attracted to develop the site in the state of contamination being proposed by NL Industries. The City did not cause the site to be contaminated and the City should not be required to bear the very substantial costs of having to remove contaminated soils exposed in the course of redeveloping the site. Requiring a potential future developer or owner of the site to bear those costs assures that the site will go undeveloped. Allowing NL Industries to proceed with its preferred alternative under the RMP would be tantamount to rewarding NL Industries for causing the site to become polluted and would fly in the face of Section 106's authorization to fashion such relief "... as the public interest and the equities of the case may require."

CONCLUSION

The RMP by NL Industries would leave the property highly contaminated, abandoned, and unusable. Such an approach is not consistent with Section 106 of CERCLA, the public interest, or the equities of the situation. The facts and circumstances of this case mandate that NL Industries Inc. remove from the Dutch Boy Site all soil contaminated with lead above 1,400 mg/kg, including all such material under the concrete slabs.

Respectfully submitted,

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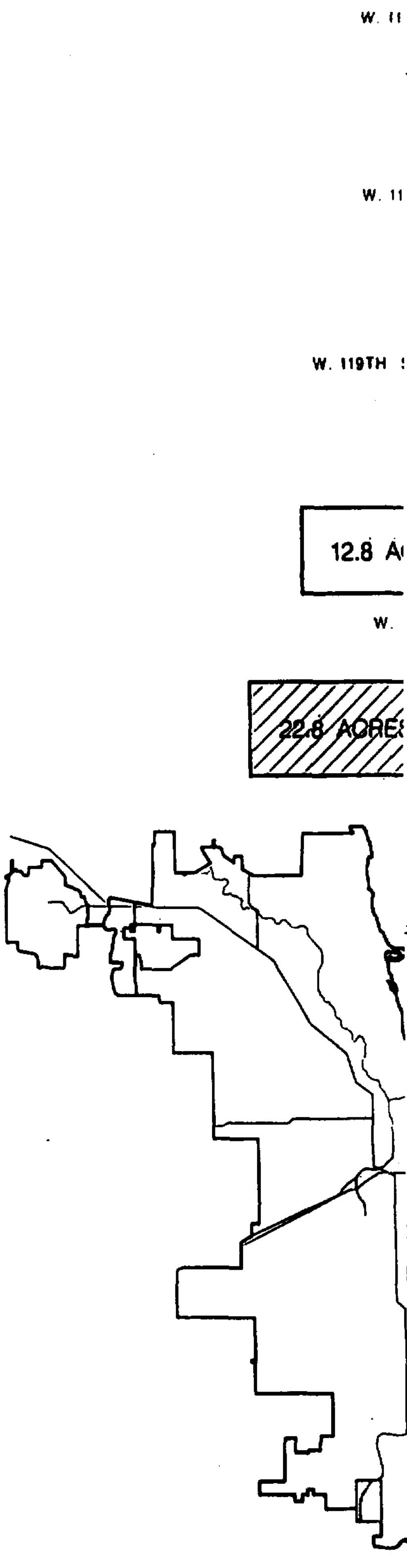
Deputy Commissioner, Brownfields Division
City of Chicago, Department of Environment

cc: Henry Henderson, Commissioner Department of Environment
Jennifer Muss, Mayor's Office Brownfields Coordinator
Susan Herdina, Deputy Corporation Counsel



GEND

INTERSECTION IMPROVEMENTS

GATEWAY

STREETSCAPING

STREET RECONSTRUICTION

REDEVELOPMENT SITE

GREEN SPACE

PUBLIC SCHOOL

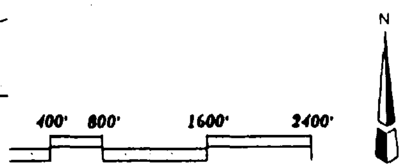
TIF BOUNDARY

PROJECTS IN PROGRESS

INTERSTATE ACCESS

METRA STATION

CITY LIMIT



.I.F. DISTRICT

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TABLE 1
Comparison of Alternatives

Elements	Attributes	Alternative 2	Alternative x
Excavation of exposed soils	None Limited 2 feet # feet - in hot spot areas hot spot removal Complete removal	x (2 feet)	
Treatment of excavated hazardous soil	Onsite Offsite	x	
Disposal of excavated soil	Onsite Offsite	x	
Cover	Backfill to original grade 2 to 5 feet of soil cover Multilayer cap RCRA-equivalent cap Source of cover material	x	
Debris pile	Removal	x	
USTs Closure	None Regulatory required closure Complete closure - in place - removal	x	
Paved area investigation			